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# AN EFFECTIVE MEASUREMENT OF HIGH SPEED COMMUNICATION NETWORK ANTENNA DESIGN IN 5G BROADBAND APPLICATION

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***Abstract***

***An access point is a wireless base station designed to provide wireless access to an existing network (wireless or wired) or to create an entirely new wireless network. Wireless communication is done through 5G broadband antenna design technology. Drawing an analogy, the access point can be conditionally compared to the tower of a cellular operator, the access point has a short range and the connection between the devices connected to it is carried out using 5G broadband antenna design technology. The range of a standard access point is approximately 200-250 meters, provided there are no obstacles at this distance. In most cases, wireless networks (using access points and routers) are built commercially to attract revenue from customers and tenants. In this paper the designing of high-speed communication network antenna for 5G broadband applications. This proposed 5G broadband antenna design acquirers have experience in preparing and implementing the following plans for implementing network infrastructure based on wireless solutions. It should be noted that the SSID (Wireless Network Identifier), Channel and Encryption Type must match for correct operation in Repeater and Bridge modes.***

***Keywords:***

***Access Point, Base Station, Wireless Network, 5G Broadband Antenna Design, Cellular Operator, Routers, Communication Network***

## 1. INTRODUCTION

Wireless networks from multiple access points are installed in large office spaces, buildings and other large facilities, mainly to create a wireless local area network (WLAN) [1]. Up to 254 client computers can be connected to each access point [2]. In most cases, connecting more than 10 computers to one access point is impractical [3]. The data transfer rate for each user is distributed equally, and if there are more "clients" at an "access point", the speed of each of them will be lower [4]. For example, according to our measurements, the actual data transfer rate of an access point operating in the 802.11g standard is 20-25 Mbit / s, and when 10 clients connect to it, the speed of each is in the region of 2.5 Mbit / when creating geographically distributed networks or wireless networks in buildings [5]. Access points are connected to a common network via a radio channel or a local area network (wire) [6]. In this case, the user can move freely with his mobile device within the boundaries of this network. In a home network, wireless access points can be used to connect all home computers to a common wireless network or to "extend" an existing network, such as a wired router [7-8]. Once connected to the AP router, clients can join their home network without reconfiguring their local connection [9].

The access point has the same design as a wireless router. Wireless routers are used to create a separate network segment and support them to connect all computers with built-in wireless network adapters [10]-[11]. Unlike an access point, a network switch is connected to a wireless router, so that clients can additionally connect via the Ethernet protocol or connect other routers when creating a network of several wireless routers [12]. In addition, wireless routers have a built-in firewall to prevent unwanted intrusions into the network [13]. Otherwise, wireless routers are similar in design to access points. Like wireless routers, most access points support 802.11a, 802.11b, 802.11g, or a combination of these [14]. A 5G broadband antenna design router works based on mobile operators' towers but, unlike towers that emit a large stream of radio radiation, the router does not cause any harm to our health, so it can be installed safely in apartments [15-16]. A typical 5G broadband antenna design router spreads the signal to an area with a radius of 100 meters, but this is considered for open spaces. If you are the lucky owner of more than 2 devices working on a 5G broadband antenna design network, having a 5G broadband antenna design router will be very convenient for you [17]. With this, you can set up a wireless home network in your home. But remember that any device connected to the router will slow down your internet speed [18]. Of course, this will not reduce the overall speed of your Internet, but individually, the Internet will work a little slower. To understand the principle of operation of a 5G broadband antenna design router, there is nothing difficult: the Internet provider runs a wire to your apartment, which connects to a 5G broadband antenna design router; all kinds of devices can be connected via 5G broadband antenna design [19-20]: laptops, desktop computers, digital televisions and even cameras [22]. A router's job is to divide what it receives from the provider among all the devices. Therefore, it is better to protect the connection to your 5G broadband antenna design network with a password [23]

## 2. LITERATURE REVIEW

The Internet has become so familiar in the lives of ordinary people that when moving to a new house, the first question is to install an Internet cable there. But if earlier most people in the apartment had only one computer, now each family member has a separate personal gadget with Internet access, and they are all connected not by a cable, but by a 5G broadband antenna design interface, so there is a problem buying equipment that can meet these needs [1]. When you come to the store, you will see different types of devices (routers, access points, repeaters) that are similar in function. Although network equipment performs similar tasks, it differs in its functionality and capabilities [2].

When choosing equipment for wireless communication in their home, many users do not see the difference between an access point and a router and often buy the wrong things. Both devices appear to transmit a 5G broadband antenna design signal, but the difference between them is huge [3]. Also, for larger homes, you need to reach far and extend to different floors

depending on the situation, which means a lattice router. It extraordinary speeds and executioner gaming highlights and showcases amazing customization choices [4]. Get the best quality performance and lifetime insurance against interference and malware to cover your entire home network and provide long-range protection without membership fees [5].

First, having one of the most mind-blowing wireless routers in your home is a fundamental part of today's online-based life. However, this is a simple method to improve your home network. Plus, a new router can quickly show up every laptop, smart TV, game control center, and doorbell camera in your home [6]. Not only do you get faster 5G broadband antenna design connections, but the latest wireless routers also have the highest number of network security features. Also, there are app-based settings interfaces and easy-to-use parental controls. Antennas move to focus signals [7]. So read on for our list of the best home wireless 5G broadband antenna design routers. However, with most of our lives spent online, from school and work to gaming and streaming, there's no viable substitute for the first-class performance that a great wireless 5G broadband antenna design router provides [8]. It has splits that control the entire associated gear, giving it an unadulterated ability to protect gaming and each. A device you own. It's about the same size as a general-purpose switch, real gaming gear, and a network security shield with fair value, nothing unexpected [10]. The switch bypasses gateways through most competing routers. However, the most up-to-date wireless standard offers the best performance we've ever seen, and it can handle a whole house full of related gadgets [21].

## 3. PROPOSED MODEL

If we put an access point on the node, the main router will distribute IP addresses, and the devices will be on the same network, which is often very important. Also, access point mode is useful for distributing 5G broadband antenna design from the modem, which does not have such a possibility. In fact, there are many applications. Otherwise, access points are not sold as separate devices because they have no meaning. Note that most routers can work in other modes that suit you

### 3.1 STRUCTURE OF ACCESS POINT (AP)

An access point is a small station that creates a connection to an existing network. It will receive and send internet connection from the router. There are expensive models that allow you to do this without routers, but they vary greatly in price. It should also be noted that there is only one link per access point. An access point is a simple separation of a wireless interface that allows you to cover a certain part of your apartment with a radio signal, often the device is used. The structure of accesspoint was demonstrated in the following Fig.1:

- Receive internet traffic and broadcast it to other gadgets via 5G broadband antenna design. That is, we connect our AP to existing network equipment (wireless interface or computer-less router) that sends a signal via radio frequencies to your gadgets.
- Receive the radio signal from your gadgets and send them further through a cable (feedback).
- Also, the access point is used in repeater (repeater) mode to increase the existing 5G broadband antenna design coverage area. That is, if you already have a router and you need to send the signal to client machines, installing an AP will help solve this problem.

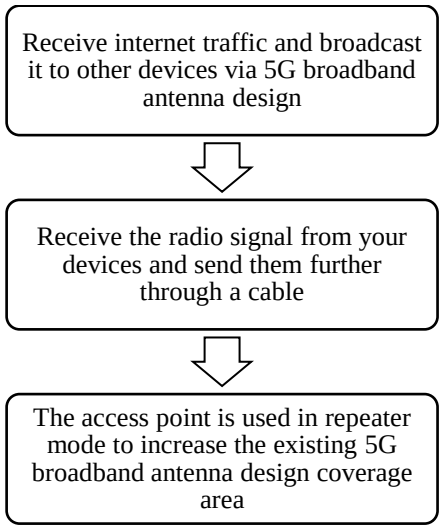


Fig.1. Simple separation of a wireless access point interface

But the access point has additional features. It allows you to create a 5G broadband antenna design connection based on an existing one. This is necessary in cases where the router cannot distribute the Internet on its own at the required distance. You can use it to reduce the load on the router. There are many applications. The access point only forwards the connection, which means that if there are several computers on the home network, they must be configured separately.

This question is not always relevant for small local providers who build a network and do not require users to set up a local connection. There may be a problem setting up a local network between home devices. Sometimes it is even necessary to involve a provider to solve it. An access point does not protect your Internet connection, but it does have an encryption function. Often, the provider is involved in protecting the user's network from outside aggression. To get the maximum speed from the provider, you need to bypass the access point and connect to the network via LAN. In AP's defense, we can say that the speed of the wireless network is suitable for almost all tasks and the need for super speed appears very rarely. The access point clearly displays the IP without the possibility of further adjustment. This parameter can be considered as plus and minus.

### 3.2 STRUCTURE OF ROUTER

A router is a special network device with multiple interfaces. It is allowed to exchange data between different devices on the network. The router is capable of distributing 5G broadband antenna design to all nearby devices. Routers or as they are also called routers are very complex devices. Among other things, they differ in that they can be used to organize a new network, and the AP is already built there. Router Functions are demonstrated the Fig.2:

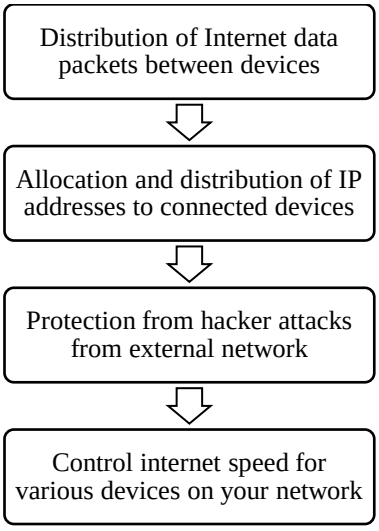


Fig.2. Functions of Router

- Distribution of Internet data packets between devices.
- Allocation and distribution of IP addresses to connected gadgets.
- Protection from hacker attacks from external network (built-in firewall).
- Control internet speed for various devices on your network, as well as filter MAC addresses, IP addresses and other parameters to prevent them from entering your network.

What a router and an access point have in common is the answer is quite simple. Most modern routers have the function of creating a new wireless network. Access points operate on a similar system. This allows 5G broadband antenna design to be used on all home devices. The router connects to the provider's network "on its behalf". In other words, you need to conFig.the connection to the provider on the device and set the conditions for distributing traffic in the home network. Also, all the equipment already handles only one router, which means you don't need to conFig.all the equipment on the network to connect to the Internet and easy setup of a local network between home devices. The functionality embedded in the router is distributed independently to the devices on the IP network. Basically, the router has its own built-in firewall and firewall, which provides additional protection to network devices from unauthorized access. This doesn't mean you don't need an antivirus or firewall on your computer, but rather it's a nice plus. Maximizing the network speed will allow a direct connection to the router via LAN. Also, the 5G broadband antenna design router has the ability to adjust the connection speed by the user. Special programs sometimes require a flexible IP configuration to work. A router can provide similar functionality.

From this, we can conclude that a 5G broadband antenna design router is a router with a built-in access point, and the AP cannot do anything except distribute 5G broadband antenna design. That is, if we need to provide ourselves with a wireless interface for the apartment, we need to buy a router. You can only limit yourself to buying an AP if you already have a router without 5G broadband antenna design functionality. 5G broadband antenna design surrounds us everywhere. We can no longer imagine life without these networks that allow us to connect to the Internet anywhere. But they cannot rise on their own. For this, special network devices are used. There are a lot of them. In this article, we will consider one of these devices and find out what a 5G broadband antenna design access point is.

## 4. RESULTS AND DISCUSSION

The device can be placed in various ways. Standard placement options are desk or wall. But you can also plug into an outlet, which is suitable for repeater mode. It is the most convenient and easy way of all. The proposed high speed communication network antenna (HSCNA) design was compared with the existing Planar Microstrip Patch Antenna design (PMPAD), Design of wideband planar antenna (DWPA), broadband antenna design electrically small microstrip antenna (BESMA) and A smart design of a multi-dimensional antenna (SDMDA)

### 4.1 FREQUENCY OF TRANSMISSION

Transmitters can operate at different frequencies - 2.4 GHz and 5 GHz. Models are sold that support these frequencies simultaneously. Apart from more lights on the front panel, these devices look identical at first glance. Although we already know that this is not the case. Now you can consolidate what was written above and highlight the main differences between a router and an access point shown in the Table.1,

Table.1. Frequency of transmission

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 72.15 | 76.87 | 62.30 | 87.63 | 92.96 |
| 200 | 73.64 | 78.80 | 64.50 | 89.07 | 94.00 |
| 300 | 75.45 | 80.53 | 65.65 | 90.79 | 94.77 |
| 400 | 77.05 | 82.39 | 67.50 | 92.32 | 95.72 |
| 500 | 78.70 | 84.22 | 69.18 | 93.90 | 96.63 |
| 600 | 80.35 | 86.05 | 70.85 | 95.48 | 97.53 |
| 700 | 82.00 | 87.88 | 72.53 | 97.06 | 98.44 |

#### 1.1. Transmitter power

The resulting transmitter power affects the strength and distance the signal is sent. Also, at higher power, the network passes better through walls and other obstacles. A router can also be an access point. In other words, it is a multifunctional device. An access point can only perform one function, which is to be an access point shown in the Table.2,

Table.2. Transmitter Power

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 66.64 | 69.69 | 55.75 | 80.49 | 89.40 |
| 200 | 68.27 | 71.43 | 57.33 | 81.91 | 90.69 |
| 300 | 68.75 | 73.77 | 59.53 | 83.17 | 91.70 |
| 400 | 70.04 | 74.58 | 61.16 | 85.16 | 92.59 |
| 500 | 71.10 | 76.62 | 63.05 | 86.50 | 93.74 |
| 600 | 72.16 | 78.32 | 64.89 | 88.03 | 94.80 |
| 700 | 73.23 | 80.02 | 66.74 | 89.55 | 95.86 |

But buying a device with a strong signal is impossible without special permission. The maximum permissible transmitter power in our country is 20dBm. Any other professional equipment must be registered with specialized authorities.

### 4.2 MAXIMUM TRANSMISSION SPEED

Each access point has its own standard for supported communication. It allows you to make decisions about the speed at which you use the Internet. Information about quality should be checked before purchase. The best thing here is to consult a professional. It is a device used indoors as an important part of a local network. Access points can be for indoor or outdoor use shown in the Table.3,

Table.3. Maximum transmission speed

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 62.38 | 78.47 | 62.66 | 86.60 | 92.50 |
| 200 | 63.02 | 79.99 | 63.91 | 87.69 | 93.66 |
| 300 | 63.68 | 80.23 | 66.64 | 88.17 | 94.43 |
| 400 | 64.33 | 81.32 | 68.38 | 89.06 | 95.46 |
| 500 | 64.98 | 82.20 | 70.37 | 89.84 | 96.43 |
| 600 | 65.63 | 83.08 | 72.36 | 90.63 | 97.39 |
| 700 | 66.28 | 83.96 | 74.35 | 91.41 | 98.36 |

### 4.3 NUMBER OF ANTENNAS

This parameter is completely related to the previous paragraph. The more antennas a 5G broadband antenna design access point has, the higher its speed. But you must understand that not all antennas can be used. Some of them won't work if the receiving device, like a laptop, has too few of them shown in the Table.4:

Table.4. Number of antennas

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 56.75 | 73.79 | 55.91 | 91.50 | 94.40 |
| 200 | 58.24 | 75.76 | 58.33 | 93.70 | 94.39 |
| 300 | 59.04 | 76.89 | 58.74 | 94.50 | 95.59 |
| 400 | 61.37 | 78.08 | 60.34 | 95.17 | 96.07 |
| 500 | 62.52 | 79.63 | 61.76 | 96.67 | 96.67 |
| 600 | 63.98 | 81.03 | 63.13 | 97.85 | 97.29 |
| 700 | 65.45 | 82.43 | 64.50 | 99.03 | 97.91 |

### 4.4 PORT SPEED MANAGEMENT

These ports connect the transmitter to the wired network. If you are the owner of a high-speed Internet connection, you should choose the maximum allowed speed of these ports, i.e. up to 1000 Mbps. If your provider does not allow the use of very fast connections, a speed of 100 Mbps will be enough. Basically, there is only one LAN port to connect a cable with Internet access. A router, depending on the model, has one incoming LAN port and several outgoing ports for routing shown in the Table.5,

Table.5. Port speed management

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 68.23 | 73.89 | 57.30 | 90.84 | 97.41 |
| 200 | 69.43 | 75.21 | 58.03 | 92.16 | 97.79 |
| 300 | 70.04 | 76.04 | 58.92 | 92.70 | 98.36 |
| 400 | 70.45 | 76.44 | 59.00 | 93.00 | 98.06 |
| 500 | 71.36 | 77.52 | 59.81 | 93.93 | 98.54 |
| 600 | 72.08 | 78.36 | 60.41 | 94.63 | 98.79 |
| 700 | 72.81 | 79.21 | 61.01 | 95.33 | 99.04 |

### 4.5 POE SUPPORT

It is a specialized function that transmits power and data using a transmitter. Used when the transmitter is located at a considerable distance from stores and other sources of power supply. But such activity significantly increases the cost of the access point. This function is mainly used in professional models shown in the Table.6,

Table.6. PoE Support

| Inputs | PMPAD | DWPA | BESMA | SDMDA | HSCNA |
|---|---|---|---|---|---|
| 100 | 65.26 | 70.16 | 53.40 | 87.30 | 94.56 |
| 200 | 65.15 | 70.18 | 53.23 | 87.03 | 94.06 |
| 300 | 65.13 | 71.06 | 53.96 | 87.33 | 94.18 |
| 400 | 65.05 | 71.37 | 54.09 | 87.25 | 93.89 |
| 500 | 64.99 | 71.82 | 54.37 | 87.27 | 93.70 |
| 600 | 64.92 | 72.27 | 54.65 | 87.28 | 93.51 |
| 700 | 64.86 | 72.72 | 54.93 | 87.30 | 93.32 |

## 5. CONCLUSION

If you can make a clear choice between these devices, most likely, the router will defeat the access point and it will disappear from the store shelves. But, in fact, each device has its own purpose. If you need to organize your home network, the easiest way to do this is to use a 5G broadband antenna design router. Single network configuration system and all your phones, tablets and computers internet access (via air and cable). To organize a hotspot in a cafe or to create a seamless network in a large place, you need to pay attention to the wireless access point. To begin with, the router you want to create an access point with is an access point, and works. The proposed high speed communication network antenna (HSCNA) design was compared with the existing Planar Microstrip Patch Antenna design (PMPAD), Design of wideband planar antenna (DWPA), broadband antenna design electrically small microstrip antenna (BESMA) and A smart design of a multi-dimensional antenna (SDMDA).

In a cut-off measurement the proposed design achieved 95.72% of frequency of transmission, 92.59% of Transmitter Power, 95.46% of Maximum transmission speed, 96.07% of Number of antennas, 98.06% of Port speed management and 93.89% PoE Support. Hence the proposed design achieved the better results while compared with the other existing models. It runs an IP distribution server, often has a firewall, and, roughly

speaking, it creates routes between connected devices, so it's also a router. Therefore, to turn a router into an access point, it is enough to disable some of its functions and connect it to another router via a cable.

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