

Brief Study of Positive and Negative Sides of Bluetooth Earpiece

Nikita Sharma
SOC &E, IPS Academy,
Rajendra Nagar, Indore, M.P., India

Abstract-- Bluetooth is a (short-range) wireless standard, which has been improved over the years. Bluetooth is a method for data communication that uses short-range radio links to replace cables between computers and their connected units. Now a days, Bluetooth earpiece have become very popular and some people wear it all day long on their ear, these people also hold their cell phone in their pockets or in a belt clipper and by that expose themselves to electromagnetic radiation all day long. This paper will focus on the basic introduction of Bluetooth technology, benefits of Bluetooth earpiece, effects of earpiece on health (i.e. negative side of Bluetooth earpiece), and alternatives of Bluetooth earpiece and at the end of this paper we will conclude about the positive and negative side of the Bluetooth earpiece. The main aim of the paper is to make a clear vision about effects of Bluetooth earpiece, because when we use earpiece we double expose our self with the radiations.

Keyword-- Pulsed Radio Frequency Signals, Special Interest Group (SIG), Electromagnetic Field (EMF), Faraday Cage Effect, World Health Organization (WHO), Air Tube Headset, Retro Handset Telephone.

I. INTRODUCTION

Bluetooth is the name of a wireless technology that uses pulsed radio frequency signals. Here is what Dr. Andrew Goldsworthy has to say about pulsed radiation: "Pulses carried by microwaves are particularly dangerous. This is because their very short wavelength allows the transmission of pulses with extremely rapid rise and fall times, and it is the rate of change of the fields (rather than their total energy) that does most of the biological damage". when we talk about pulsed radio frequency signals we are of course talking about radiation, or in this case Bluetooth radiation. Bluetooth is now used extensively in today's world, in cell phone headsets, computer accessories such as keyboards, printers, personal digital assistants (PDAs), personal media players, GPS, gaming equipment, and also various medical health and wellness devices. [1]



Fig.1: This figure shows Bluetooth symbol.

According to some researchers we can define Bluetooth as: "A proprietary open wireless technology standard for exchanging data over short distances".

Which basically means it's a wireless system. Bluetooth transmits at frequency level in the 2.4GHZ band; this is same as our microwave oven (means we are dealing with Electromagnetic Field or EMF). Bluetooth is managed by the Bluetooth Special Interest Group (SIG), The Bluetooth Special Interest Group (SIG) now lists over 6000 products that utilize Bluetooth technology. [12]



Fig.2: This figure shows extensively use of Bluetooth in some devices.

Class	Maximum Power	Operating Range
Class 1	100mW (20dBm)	100 meters
Class 2	2.5mW (4dBm)	10 meters
Class 3	1mW (0dBm)	1 meter

Fig.3: Different classes of Bluetooth technology

A Bluetooth earpiece or headset provides a two-way connection to the user's cell phone via Bluetooth. All Bluetooth cell phone users are employing two wireless technologies: Bluetooth technology between ear and cell phone and the carrier's transmission technology between cell phone and cell tower. When we use a Bluetooth earpiece we are always exposing our self to both Bluetooth radiation and cell phone radiation, a double whammy. We are getting a double dose of microwave radiation.

II. POSITIVE SIDE OF BLUETOOTH EARPIECE

Now a days, As we are seeing that everyone is using Bluetooth earpiece while working, sitting or doing anything. This is becoming a need of life. Here we are discussing about the positive points of Bluetooth device. Points are:

i. Productivity

Headsets free our hands so that we can work, take notes, open drawers to find files and do a myriad of other things while you're on the phone. With a cordless headset, we can even walk around to grab co-workers or resources in support of your call. The physical freedom that headsets provide lets workers determine how much of their attention to give to the phone call, letting them potentially increase their productivity. [3]

ii. Sound Quality

Headsets optimize sound quality for both ends of the conversation. They're easy to listen to because they have high-quality speakers that are held onto your ear in a position that you determine. Many headsets have amplifiers that let you set the tone and volume of the sound. The microphone is in the perfect position to pick up your voice while also being out of the way of your facial movements and the rubbing and scratching sounds that they can cause. In addition, many headsets also have noise-cancelling technology that actively blocks background sounds. [3]

iii. Stylish & Affordable

Wireless earpiece and earphones are sophisticated and stylish. Many have a sporty design because they are made to stay firmly in place when you are working out or running for long distances. Even casual listeners can enjoy the sleek design of any style of wireless headphones. The sleek design of Bluetooth headsets also creates a fashion trend for the young generation. Wireless doesn't always mean more expensive. Many of the Bluetooth headphones and earpiece are available with appropriate cost. [4]

iv. Small Size

Bluetooth headsets are small and lightweight which makes it easy to wear them and carry them. Wearing these headsets is also very easy as these are shaped to fit all sizes of ears. [5]

v. High Compatibility

Bluetooth headsets are compatible with all Bluetooth enabled devices like mobile phones, PDAs, PCs, laptops and music players etc. Hence, you can use one headset to connect with a range of devices and enjoy great sound quality whether it is calls or listening to music. [5]

III. NEGATIVE SIDE OF BLUETOOTH EARPIECE

After talking about the positive side of Bluetooth earpiece, now we will see its negative points. According to the World Health Organization (WHO) has acknowledged the "anxiety and speculation" regarding electromagnetic fields (EMFs) and their alleged effects on public health. [6] Using any type of wireless technology is putting our self in a field of microwave radiation. The effects of long term microwave radiation exposure upon the body have been documented in countless studies for decades.

Long-term exposure to microwave radiation has been linked to:

- headaches
- cancer
- leukemia
- brain tumors
- Alzheimer
- autism
- ADD
- miscarriages
- birth defects
- autoimmune illnesses
- multiple sclerosis
- hair loss
- suicide

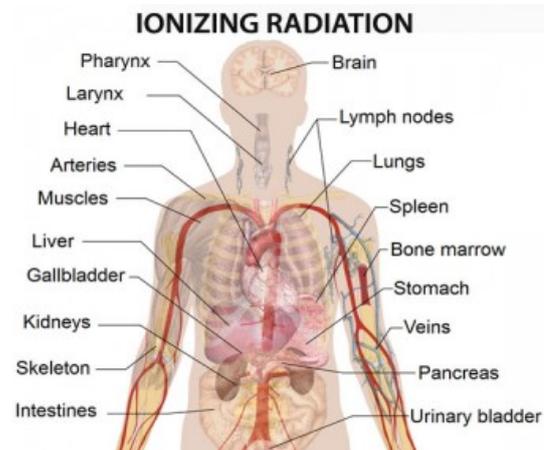


Fig.4: It shows how radiation effects on our body.

Microwave radiation has been shown to affect biological changes within the body. These biological changes happen on a cellular level and their effects can be passed on to offspring via genetic damage (DNA, RNA). [7] DNA and cellular damage caused to physical organisms by microwave radiation is directly related to the power of the signal and the length of exposure. [8] Their high-frequency electromagnetic fields can lead to a significant increase in blood pressure and affect biological processes in the body just the same as cell phones. Just two hours of exposure to high-frequency EMFs from a cell phone or Bluetooth headset, can cause irreparable DNA damage. [1]

We can also link:

- Blindness
- Deafness
- Brain tumors
- Neck pain
- Skin rashes
- Headaches [7]

Multiple studies have reported that as short as a single, two-hour exposure to cell phone or blue tooth radiation will result in pathological leakage of the blood-brain barrier. Using a Bluetooth Headset exposes the brain, the ears and the eyes to a strong field of microwave radiation.

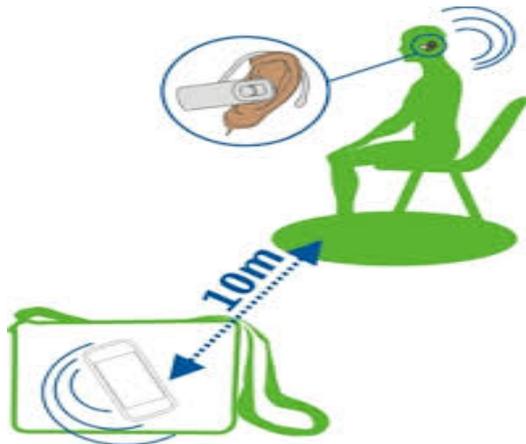


Fig.5: It shows a person using Bluetooth headset (EMF around him)

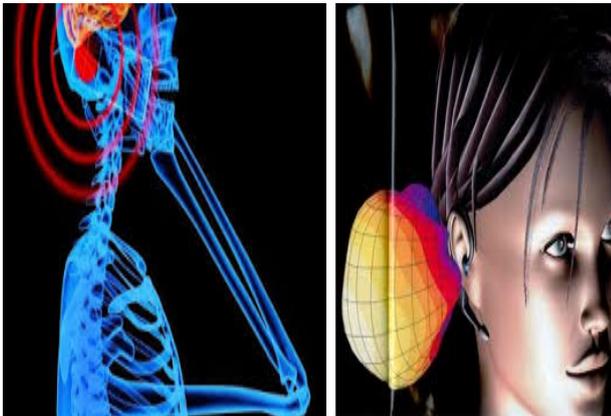


Fig.6: It shows how a Bluetooth Headset exposes the brain, the ears and the eyes

If you use Bluetooth earpiece in a car the effects are multiplied due to the Faraday cage effect. (Using cell phone in car is dangerous. Not just because it can cause an accident. There's also a direct effect on our health.[1] The radiations emitted from our cell and Bluetooth device are reflected back by the cars metallic structure magnifies the radiation. It's called the Faraday cage effect, But using a cell phone in a car works on the same principles as a microwave oven. In both cases they are metallic enclosures where radiations are magnified. This radiation from cell phone bounces around car and is absorbed by your body at a much higher level than would otherwise be. [9]



Fig.7: It shows Faraday cage effect.

IV. ALTERNATIVE WAY FOR BLUETOOTH HEADSET
 Some researchers recommend using an air tube hands-free kit and a retro handset telephone which reduce radiation exposure. [1]

- We can use a radiation free air tube headset. These work much like a wired headset but there are no wires to conduct the radiation but air tubes conduct the sound. Obviously with this alternative, we don't get the freedom of movement that you get with a wireless connection, and the sound quality on this particular model is excellent while reducing exposure to EMFs. [10] (By this alternative we can reduce the radiations of both Bluetooth and cell phone radiations.)

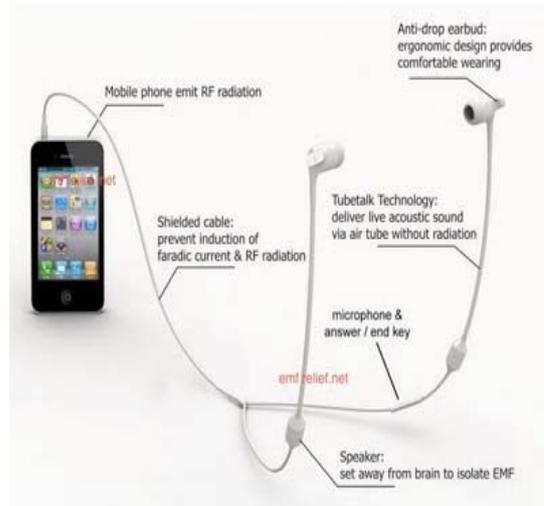


Fig.8: Radiation free air tube headset

Use a retro handset telephone. The length of the cord means you are still in close proximity to your cell phone so you will be absorbing some radiation. But at worst using this device is clearly much better than having the cell phone pressed against your ear. [10] (We can use this instead of Bluetooth earpiece and can minimize the Bluetooth radiation as well as cell radiation.)



Fig.9: Retro handset telephone

V. CONCLUSION

At last if we talk about the facilities given by Bluetooth earpiece then definitely we will say Bluetooth earpiece are very cool, they allow us to communicate without using cords and wires. But there is a down side also. All Bluetooth devices emit Electromagnetic Radiation. This radiation is dangerous. Bluetooth headsets are particularly dangerous because they are held within centimeters of the brain and they are used in conjunction with a cell phone (double radiations). In this paper we have studied about the both side of Bluetooth device (positive and negative side), means how it is beneficial for us and how it is harmful for us. On the basis of this discussion, we can conclude that we should minimize the use of Bluetooth device and in case if we need to use then we should go with its safer side (alternative approach i.e. Air tube headset, Retro handset telephone).

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