Red Tacton and It's Applications

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Abstract : Due to the massive growth of wireless communications, we tend to have imagined the future as as an area packed with with antennas and emitters and this gives an idea of using our body as a data transmission device. Hence NTT labs, the Japanese telecommunication cluster had developed a technology referred to as Red Tacton. Red Tacton gives a new meaning to networking. It is a new Human Area Networking technology. It uses the surface of the physique as a high speed data transmission path that is safe. Red Tacton is a technology that is completely different from Bluetooth, wireless or Infrared. It doesn't admit a lightweight wave or magnetic attraction to transmit information. It makes use of weak electric fields on the surface of the body. Users of red tacton can narrowly limit signal recipients instead of broadcasting to all or any devices within a range.

IndexTerms **- Red Tacton, Human Area Networking(HAN).**

I. INTRODUCTION

Today within the era of technology, where everyone needs access to information at their fingertips, networking and communication area unit the foremost necessary aspects of everyone's life. Data communications (DC) is the process of using computing and communication technologies to transfer information from one place to another. It allows the movement of electronic or digital data between multiple nodes, regardless of geographical location, technological medium or information contents[4].

Network can be categorized based on scale or scope of network, it is classified into Local Area Network (LAN), Metropolitan Area Network (MAN) and Wide Area Network (WAN). Based on type of service that a network caters, it is classified as Connection Oriented or Connection less networks.

Existing communication technologies range from wired to wireless medium. In wired network internet connection is being taken using T1 line, cable modem or using any other means. In wireless network, medium is made of electromagnetic waves (i.e. EM Waves) or infrared waves. All the wireless devices will have antenna or sensors. The main advantage of a wireless network over a wired one is that it provides mobility to users which means users can move around freely within the area of the network with their laptops, handheld devices etc and get an internet connection. There are also some shortcomings of wireless network, file-sharing transfer speed suddenly decreases if the numbers of users are increasing in any multi-user environment. Wireless networks are generally less secure.[5] Red Tacton technology comes right in between wireless and wired connection. It provides maximum security and data transfer without the use of physical connections. Red Tacton can be used to easily exchange information through natural actions such as touching.

This paper is organized as follows: Section I discusses Human Area Network (HAN), Section II discusses Red Tacton, Section III discusses Applications of Red Tacton. And, Section IV finally concludes our paper.

II. HUMAN AREA NETWORKING

Human Area Network provides communication in devices via human body i.e. human body acts as transmission media. Using human body for communication may result in high throughput, better security and reduced setup cost of networks.

In present services (which imply communication between electronic devices embedded in the environment in close proximity to people), if we tend to use the human body itself as a transmission medium, the this would be an ideal way of implementing Human Area Network because it would resolve all the problems comprising throughput reduction, low security and high network setup cost. [2]

This concept of intra-body communication was first proposed by IBM [1]. However, all these technologies had two limitations:

1) The operating range through the body was limited to a few ten of centimetres.
2) The communication speed was only 40kbit/sec.

These limitations ascend from the utilization of an electric sensor for the receiver. An electric sensor requires two lines (a signal line and a ground line) whereas in intra-body communication, there is essentially only one signal line i.e. the body itself, which leads to an unstable transmission line, so the signal is not transmitted appropriately.

Thus, Red Tacton was proposed which is free from these limitations of Human Area Network.

III. RED TACTON

Red Tacton is a new Human Area Networking technology that uses the surface of the human body as a safe, high speed network transmission path. It is distinct from wireless and infrared technologies as it uses the minute electric field emitted on the surface of the human body. A transmission path is formed at the moment a part of the human body comes in contact with a Red Tacton transceiver. Communication is feasible using any body surfaces, such as the hands, fingers, arms, feet, face, legs or torso. Red Tacton works through clothing and shoes as well. When the physical contact gets separated, the communication is ended [3].

A transmission path is formed automatically when a person comes into contact with a device and communication between mobile terminals begins. RED - It is an auspicious color according to Japanese culture for warmth/TACTON- meaning "action triggered by touching".

A feature of the technology is that, because the signal is passed to and fro the body's surface through this capacitive coupling, it can be transmitted between transmitter and receiver via the body's surface, even if one of them is in the user's pocket, and the other is under the carpet on the floor, for example. If this technology is applied to an entry control system or ticket gate, it is much more convenient than conventional contactless cards because you do not even need to remove the access card from your pocket. Other feature of the near-body electric-field communications technology is that it suppresses the emission of the electric field from the body into space, so mutual interference is reduced, and it enables intuitive connection through touch communication as the signal propagates over the bodily surface.

A. Features of Red Tacton

- A communication path can be created with a touch, it initiates the flow of data between a body-centric electronic device and a computer that is embedded in the environment.
- A wide range of natural human actions grasping, sitting down, walking or standing in a particular place can be used to trigger Red Tacton to start a networked process.
- Using Red Tacton electro-optic sensor two-way communication is supported between any 2 points on the body through put of up to 10 Mbps. Communication is not just confined to the surface of the body, but can travel through user's clothing to a red tacton device in a pocket or through shoes to communicate with a red tacton device embedded in the floor. Unlike wireless technologies the transmission speed does not deteriorate even in the pressure of large crowds of people all communicating at the same time in meeting rooms, auditoriums or stores. Because the body surface is transmission path increasing the number of connected users directly the available number of individual channels.
- Red Tacton uses wide range of materials as transmission medium as long as the material is conductive and dielectric which water and other liquids various metals certain plastics, glass etc. Using ordinary structures such as tables and walls that are familiar and readily available one could easily construct a seamless communication environment at a very low cost using Red Tacton.

B. Working of Red Tacton

RedTacton operates on the idea that optical properties of an electro-optic crystal can vary according to the changes of a weak electric field. After contract with another RedTacton enabled device, the transmitter induces a weak electric field on the surface of the body. The weak electric fields pass through the body to a RedTacton receiver, where the weak electric fields affect the optical properties of an electro-optic crystal. The extent to which the optical properties are changed is detected by laser light, which is then converted to an electrical signal by a detector circuit. It is break-through technology that for the first time enables reliable high-speed HAN. It uses the minute field emitted on the surface of human body and is distinct from infrared and wireless.

Red tacton embedded in various devices will have a transmitter and receiver built to send and accept data stored in a digital format. The transmitters send data by inducing fluctuations in minute electric field on surface of human body. The naturally occurring electric field induced on the surface of human body dissipates into the earth. Therefore, this electric field is exceptionally faint and unstable. Data is received in using photonic field senor that combines an electro-optic crystal and a laser light to detect fluctuations in the minute electric field. The chip takes any type of file, such as an MP3 music file or email and converts it into a format that takes the form of digital pulses that can be passed and read through a human being's electric field. The chip in the receiving device reads these tiny changes and converts this file back into original form. Its transceivers can be treated as standard network devices. The photonic electric field sensor developed by NTT enables weak electric field to be measured by detecting changes in the optical properties of an electro-optic crystal with a laser beam.

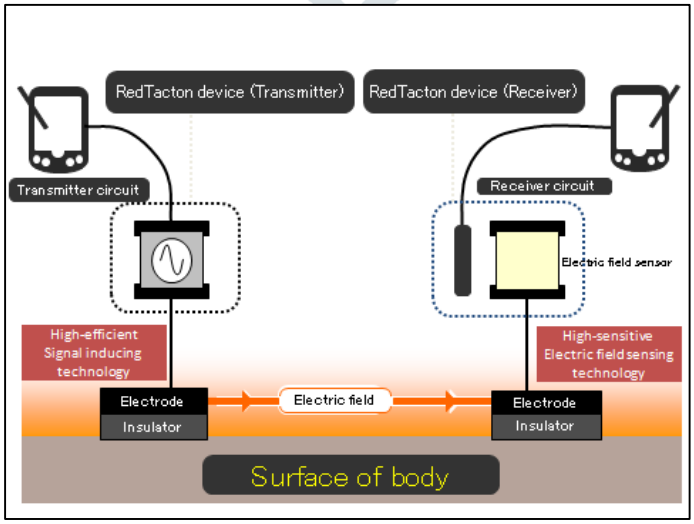

Figure 1: *Working of Red Tacton.*

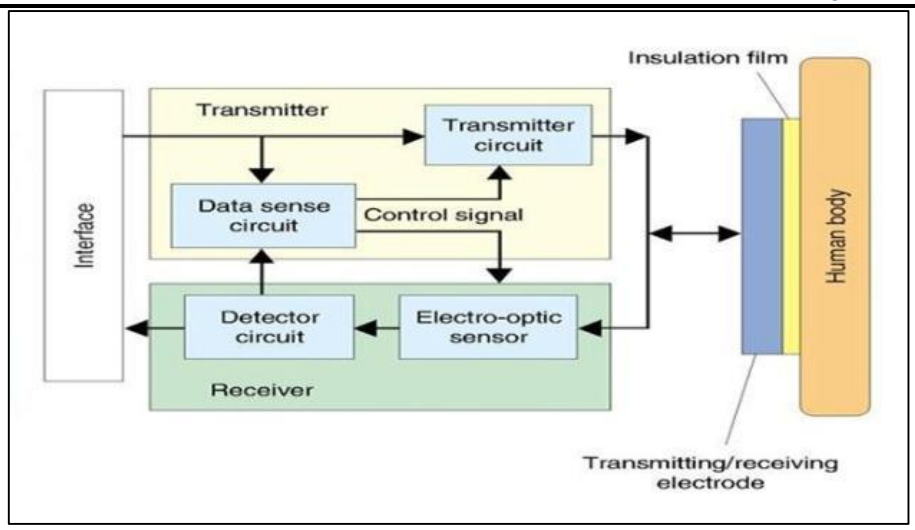

Figure 2: *Red Tacton Transceiver block diagram.*

The electric field induced towards the body by the transmitter 's signal electrode is represented by EA.The system requires a ground close to the transmitter signal electrode, so electric field EB induced from the body can follow a return path to the transmitter ground. Moreover, as people are standing on a floor or the ground, electric field EC escapes from body to the ground. The electric field ES that reaches the receiver is

It couples to the electro – optic crystals and changes the crystal's optical properties. This change is observed by the laser light and transformed into a digital data by a detector circuit.

IV. Applications of Red Tacton

There are many applications in RED TACTON technology. This technology is widely used in various applications.

A. Personalizing Device

Imports call history, music preferences or personal data into any device which we want to use. This data import can be done just by touch instead of connecting it to other devices. For this, a pre-recorded configuration script can be embedded in a mobile terminal with built-in Red Tacton transceiver, so when another devices with Red Tacton are touched, data can be downloaded via the scripts.

B. Data Transfer in Meetings/Conferences

As by using Red Tacton personal profile data can be exchanged between mobile terminals on the user, in the same way it can be used to share the agenda before meeting, diagrams drawn on white board during meeting and summary of the meeting. Data transfer can be kept private by using various authentication and encryption technologies.

C. Security related applications

There are various ways in which Red Tacton can be used as security applications. It can be used for authentication, authorization, verification as well as unlocking systems.

- Automatic authenticating user and logging in with just a touch.
- Authorization details are recorded in a mobile Red Tacton device. Corresponding details are also installed at security check points which will record the details of who touched the device.
- Red Tacton can be installed on every location where secure access is needed. This way each secure access could be initiated and authenticated with a touch. These transactions can also be logged into the security system with all the relevant details like personal identity, security clearance, etc.

V. Conclusion

The Red Tacton technology is better than many other technologies. It is used to transfer data in short distance and also provides authentication and encryption while transferring which helps us to overcome problem of computer hacking. It provides speed up to 10Mbps while transferring data. This technology enables Human Area Networking between body-centered devices and electronic devices. The user interface of this technology is completely based on natural human actions like touching, sitting, holding or walking. This technology can result in the end of use of cables. Hence it can be concluded by saying Red Tacton will prove to be an advantageous invention with various different applications.

VI. ACKNOWLEDGMENT

Thepreferredspellingoftheword “acknowledgment” inAmericaiswithoutan “e” afterthe “g”.Avoidthestiltedexpression, “Oneofus(R.B.G.)thanks...”
Instead,try“R.B.G.thanks”.Putapplicablesponsoracknowledgmentshere;DONOTplacethemonthefirstpageofyourpaperorasafootnote.

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