

Cutting-edge Technologies

Intrabody communication Wearable computing Photonic electric-field sensor

Human Area Networking Technology (RedTacton)

NTT Microsystem Integration Laboratories

For the implementation of easy-to use ubiquitous services, human area network technology for communication between mobile terminals and between terminals that are embedded in the environment has become important. When cables are used for communication between terminals, the routing of the cables is clearly inconvenient. When very weak radio signals are used for the communication, data speeds are reduced by packet collision and other such problems in crowded places such as exhibition sites and security risk from unwanted signal interception is another problem. Technology for solving such problems includes the use of the person's body as a signal path for communication. A transmission path is formed automatically when a person come into contact with a device, and communication between mobile terminals begins. This makes it possible for communication to be initiated through natural actions such as grasping, sitting, walking and stepping onto something.

Previous reports on this technology have described short communication distances of several tens of centimeters and rather low maximum data speeds of 40 kbit/s. The reason for those restrictions is that electrical sensors are used in the receiving circuit. Electrical sensors basically involve two-wire communication with a signal line and a ground line, so when there is only a signal line (i.e., the human body), the signal cannot be transmitted properly. The NTT Laboratories turned to the ground-independent, single-point-contact measurement capability of a photonic electric field sensor that combines electro-optical crystals with laser light for development of a transceiver that employs a photonic electric field sensor in the receiver. That is the NTT human area network RedTacton technology. Experiments on transmission between a person's two hands demonstrated transmission with error rates that pose no practical problems at data speed of 10 Mbit/s. Communication between two points other than the two hands, such as between foot and palm of hand, was also confirmed. In addition to points on the body, communication via clothing and shoes was also confirmed.

In future work we will target product development and continue with research towards more robust communication and smaller, more energy-efficient technology. We will also aggressively undertake verification experimentation with partners in industry.

RedTacton transceiver and typical applications



PC card type



Hub type

Data speed: 10 Mbit/s
Protocol: TCP/IP

