SonNet is a technology for wireless transmission of small data sets up to about 70 meters indoors and 200 meters outdoors. Building materials and various obstacles, however, affect the range.

The point of this technology is that a large number of devices can be connected to the same network and that,

- transfer is robust.
- it is easy to expand and reduce the network
- the nodes, are in principle, self-configuring

But by far the greatest advantage is that the technology consumes very little power and a battery can last up to 5 years.

The sensors continuously measure temperature and humidity and the data is transmitted to a DDC controller that regulates for example, heating or air conditioning.

The technique is based on the 802.15.4 standard that determines how the radio interface functions. The standard was developed by the International Standardisation Organisation, Institute of Electrical and Electronic Engineers (IEEE).

SonNet runs in the frequency range of 2.4 Ghz.

This frequency range is called the ISM band (Industrial Scientific Medical) a free frequency range, making this system usable worldwide.

In the range of 2.4 Ghz **SonNet** uses 16 radio channels.

At 2.4 GHz, the maximum transmission rate, without error coding, is 250 Kb/s per second.

The high transmission rate of 250 Kb s means valuable power savings since the sensors return to their sleeping mode very quickly after having been activated for data transmission over the radio network of for instance temperature readings.

In **SonNet** there may be two types of nodes - devices with limited functionality and devices with full functionality.

The first type is sometimes refered to as an **RFD** unit - **R**educed **F**unction **D**evice.

A unit with full functionality is refered to as an **FFD** unit - **F**ull **F**unction **D**evice.

There must always exist a network coordinator managing the configuration of the network.

This unit always has full functionality.

A SonNet network consists of at least one network coordinator and a device with limited functionality.

It is mainly devices with limited functionality that are designed to run on batteries.

These devices are designed to “sleep” for long periods so as to consume as little power as possible.

A device with limited functionality can only talk to an FFD device.

Two RFD devices can not talk directly to each other.

A node is the spider in the network with full functionality and typically connected to mains.

It can act as network coordinator but also as a router.

An FFD device can talk to other FFD devices, and RFD devices.

An FFD device can discover other nearby devices, and establish communication with them.

SonNet supports a couple of different network topologies.

In a star-shaped network the coordinator sits in the middle, like a spider in a web.

Other devices can then be connected to it.

It can be both FFD and RFD devices. This type of network will be the most common.

The network coordinator is an FFD device connected to the mains while the other units, such as various sensors have limited functionality.

With **SonNet**, you can also build a so-called mesh network.

Such a net, enables data to take several alternative paths between the two points.

The nodes then act as routers and can analyze where the data is sent and choose an appropriate path.

A mesh network is basically self-healing.

If a node is faulty, or affected by severe interference, data is transmitted via alternative routes.

The mesh network can only use nodes with full functionality, but at the network's endpoints there may exist devices with limited functionality.

A third topology is the so-called cluster tree which makes it possible to set up several multi-star networks to form a large network.

The cluster tree, has no alternative paths like the mesh network.

With **SonNet**, the range of a node will be between 70 and 200 meters, but since **SonNet** nodes can form mesh networks or cluster trees, data can be transmitted over much longer distances.

A network coordinator can control up to 254 active nodes.

In a **SonNet** network there may be several different types of data traffic, such as regular traffic, irregular traffic and traffic that must be sent quickly and without delay.

SonNet handles traffic types using different techniques.

Data transmitted regularly could for example be readings from a sensor.

The network coordinator sends out a signal telling you that it exists and that it is prepared to transmit and receive data.

The signal is transmitted at regular intervals.

A sleeping node senses when the signal comes, then wakes up quickly, transmits any data, listens to find out if there are any messages to receive and then goes back to its sleeping mode.

A device that only occasionally sends data need not be connected to the **SonNet** network.

Only when it needs to communicate, does it connect to the network, which makes the battery last for a very long time.

A USB stick coordinates the network, Yes, this is actually the case.

SonNet would like this radio technology to be used in wireless keyboards and mice.

In such a case there is a USB stick plugged into the computer functioning as a network coordinator.

Normally the keyboard sleeps to save power, but once you press a key it wakes up and sends information to the computer.

The keyboard is awake for five seconds awaiting further keys to be pressed.

If no key is pressed it goes back to sleep.