

**Use Case:** Safety critical alerting system

**Company:** Vestfold Audio AS

**Industry:** Welfare technology

Open  
standard

No single  
point of  
failure

## DASH7

The DASH7 Alliance Protocol (D7A) is an Open Standard for bi-directional, sub-GHz medium range wireless communication tailored for ultra-low sensor-actuator applications using private networks. D7A stems from ISO 18000-7 for Active RFID and operates in the sub-GHz ISM bands. The protocol specification is free to use without any patent or license requirements.

Sensors will securely report events and actuators can receive commands with a typical latency of 1 second while consuming only 30 uA on average. It's local synchronization and smart addressing features allow to upgrade thousands of sensors simultaneously, drastically reducing the upgrade time.

D7A fills the gap between the Short and the Large Area Networks. D7A excels in urban and industrial network installations connecting actuators and messaging applications (sensors, alarms, states) with ranges up to 500m.

## Intro

As a supplier of safety critical alerting and sensor systems, when looking for a new wireless platform, Vestfold Audio AS had a wide range of requirements which needed to be fulfilled.

- DASH7 was the only wireless platform able to fulfill them all.

The application includes:

- Alerting systems for the hearing impaired
- Nurse call systems
- Colleague safety systems
- Various other alerting system needs



## Challenges

### *Supply Chain*

As a supplier of long-term contracts, we need long-term stability in our supply chain. Being dependent on a single chip manufacturer or an official standard with versions going obsolete is not an option.

### *Safety Critical*

As our systems are used in safety-critical applications, the system cannot be allowed to fail due to a single point of failure.

### *Low Power*

To be able to make carry-on receivers with long battery life, low RX current is required.

### *Scalable with minimal configuration need*

The wireless network needs to be scalable. In its smallest form, it may consist of two devices (a sender and a receiver). On the other end, it should also be possible to deploy larger networks with hundreds of devices. Both setups must be able to be deployed and configured without the need of a PC or similar.

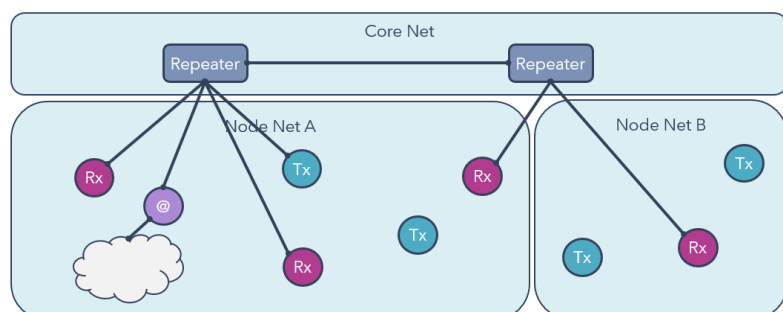
## Solution

### *Supply Chain*

DASH7 is designed to run on virtually any modern sub GHz radio transceiver. As the standard is open, you are not forced to migrate to newer versions. This ensures a safe supply of wireless modules for all current and future needs.

### *Safety Critical*

As DASH7 enable to possibility to talk device-to-device, no controller or gateway is necessary to ensure operation. The illustration shows two separate node networks which share a core network/backbone. If a Tx device for some reason is unable to reach its preferred repeater, it will automatically try to reach nearby neighboring devices directly while also transmitting to other Repeaters. Even if one or more repeaters are missing, the network will still function if the coverage is overlapping.



DASH7 also provide frequency agility - this enables the network to adapt to its environment and change frequencies for communication in case of interference.

### *Low Power*

DASH7, with its advertising protocol, enables the possibility of making low power RX devices.

### *Scalable with minimal configuration need*

As the implementation of DASH7 is customizable, we were able to design a very easy-to-use pairing mechanism. This pairing mechanism is the same no matter how large the network is which makes it scalable without additional PC's or operating systems.



## Highlights

- < 100 ms latency with battery powered receivers at 2.1 mW average consumption.
- 15-20 years estimated battery life on transmitters using 2 x AA batteries
- Over 30.000 devices shipped in the first year
- Long range, both within buildings and outside - achieved >3.500 m Line of sight (LOS) using wristband alarm button with direct transmission to a carry-on pocket receiver.