

Long range VHF data communications with Wize

M Prior-Jones, E Bagshaw

Both at Cardiff University School of Earth and Ocean Sciences.

Overview

Wize is a VHF data communications system intended for industrial and commercial use. It is derived from an international open standard used for utility metering in Europe. Since it operates on frequencies similar those commonly used for local communications on polar research stations, it offers similar wide-area coverage. Communications can be uni- or bi-directional, and the system has a low power consumption, making it possible for the terminals to be battery powered. We have trialled the system in Greenland and proven it can easily operate over a range of 1.6km.

Potential applications

Scientific applications

- Wide area wireless sensor networks
- Collecting data from instruments beneath the ice or snow
- Data accumulation – bringing data to a central hub with a satellite terminal

Operations/Logistics applications

- Reporting positions of vehicles or workers
- Monitoring levels in remote storage tanks
- Building temperature monitoring
- Any kind of remote monitoring or management which does not require large amounts of data

Example applications in facilities management: (graphic from Wize Alliance)



Technology

Wize operates at 169.4MHz, in 12.5kHz channels, and offers data rates of 2.4, 4.8 and 6.4kbit/s. Lower data rates have longest range. Transmitters are typically 500mW (+27dBm).. Marine VHF antennas can be used as the Wize frequency falls within the marine band. Maximum range with a suitable antenna and good line of sight is around 10km.

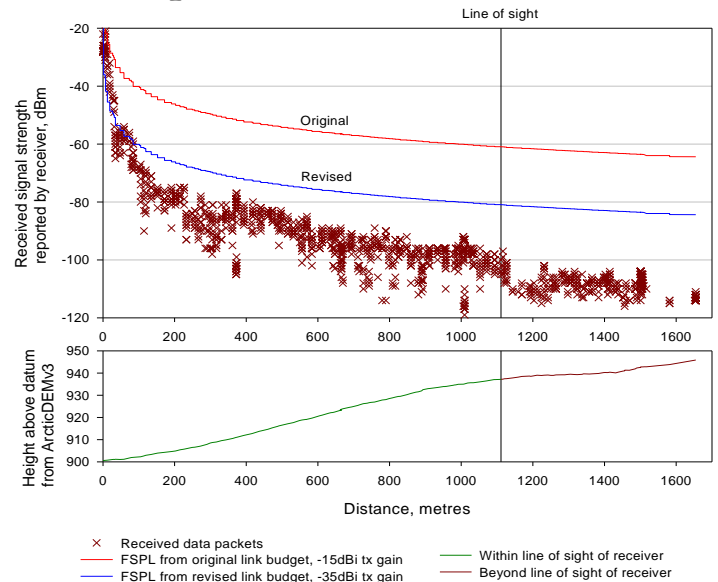
Other features include:

- Support for over the air firmware upgrades
- Optional AES-128 security
- Bi-directional communications optimized for battery-powered devices

Wize is an open standard, based on EN 13757-4:2013. Off-the-shelf implementations are available from Radiocrafts (~\$30 per module) and will likely soon be implemented by other chipvendors who support the EN standard already - such as ST, Texas Instruments and Silicon Labs.

Performance in the field

We conducted a range test on Sermeq Kujalleq (Store Glacier) in Greenland as part of our Cryoegg development process. We were able to receive signals from at least 1.6km away from our camp site, even though we passed beyond the line of sight of the receiving antenna.



The low power consumption was proven in the field: a compact 3.6V 400mAh lithium-polymer battery powered the transmitter for around 5 hours in the field, producing a data packet once per second. This was at temperatures around freezing – the system will run for around twice as long at room temperature.

Arduino Uno shield with Radiocrafts Wize module – 27 euro from AllWize

Radiocrafts Wize module (1" x 1/2", 25 x 13 mm).



Useful links

- Wize Alliance: <https://www.wize-alliance.com/>
- Radiocrafts: <https://www.radiocrafts.com/>
- AllWize (Arduino shields): <https://www.allwize.io/>
- Digi-Key stock Radiocrafts modules: <https://digikkey.com/>

With thanks to:

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Embedded Wireless Solutions

