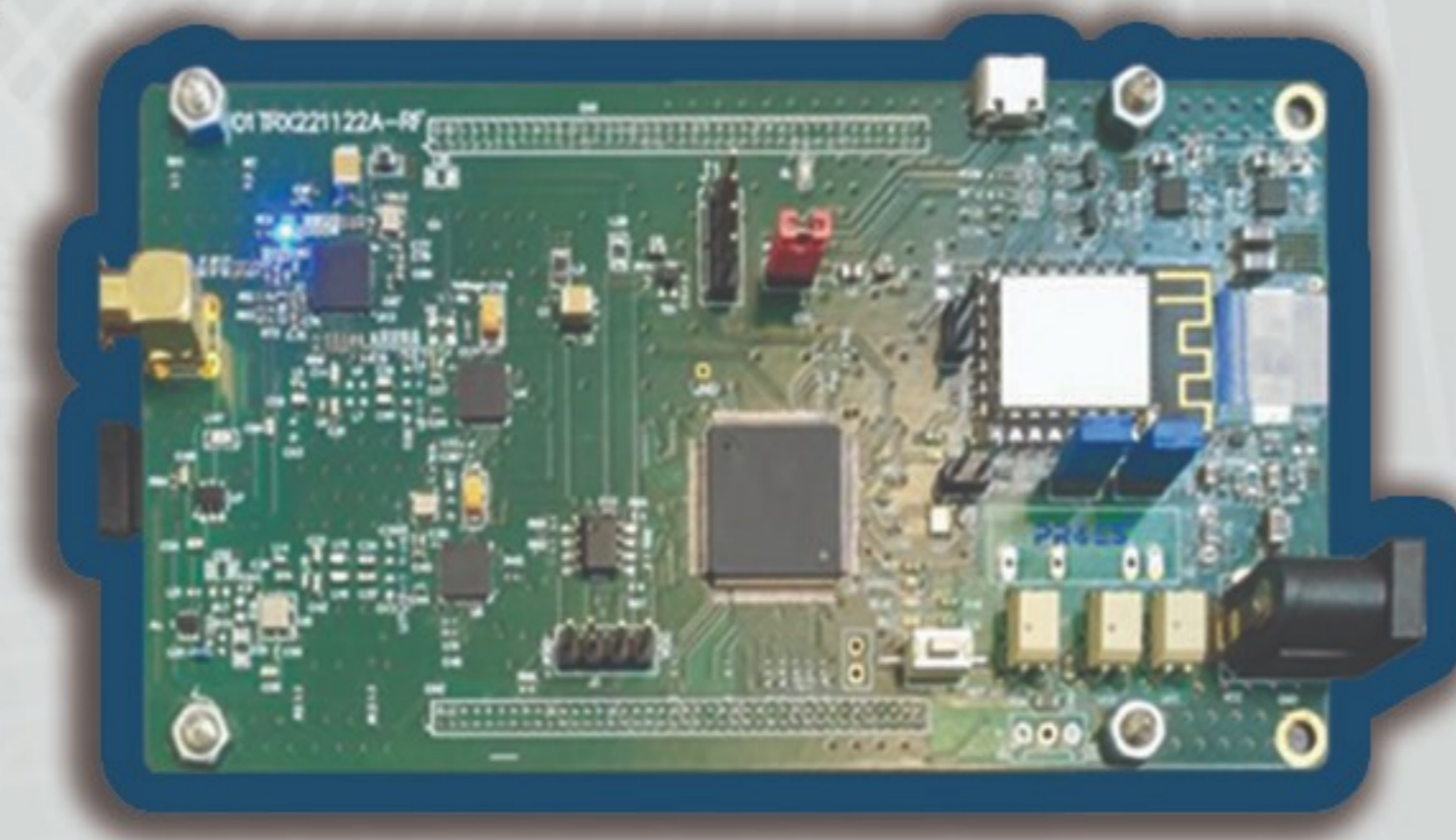### PROES TRX-V.α RF Transceiver

PROES TRX-V.α is an RF transceiver for narrow band applications providing a fully bi-directional, secure RF communication network which is developed based on PROES patented technology to improve the quality and reliability of wireless communication links.

PROES patented solution (implemented in FPGA) makes the RF link more immune to the errors arising from burst noise, channel fading, and signal interference by improving the sensitivity of the system for non-satellite, long range communication applications. This cutting-edge technology allows us to communicate up to 21dB below the noise level (i.e., when the power of the informative received signal is 128 times weaker than the power of surrounding detectable noise).

In order to maximize the performance, the receive (Rx) and transmit (Tx) paths are completely separated in our hardware design. The received RF signal is down-converted by using a fully integrated RF receiver. To generate the output signal more accurately, a separate integrated modulator was used.

PROES TRX-V.α supports 169, 433, 868 and 915 MHz carrier frequencies of the ISM bands which is also adaptable to support 70 MHz up to 8 GHz, including licensed and unlicensed radio systems.

PROES user-friendly Graphical User Interface (GUI) provides you with full control of communication network via PCs.

Advantages recap

- Signal detection below the noise floor
- Ultra-high sensitivity, reaching a staggering level down to -145 dBm
- Immunity to interference and jamming
- Immunity to burst error and fading
- Long range of communication
- Automatic Gain Control (AGC)
- RF carrier frequency and deviation programmable in 1 Hz Steps
- Automatic frequency correction (compensate the doppler effect)
- Offering 24/7 stability, Suitable for various non-human on-site industrial applications
- Remote equipment configuration, over-the-air updates, and maintenance
- Variable data rates and data packet size

Applications:

- Secure military networks
- Security and Asset Tracking Applications
- Wild fire prevention
- Internet of Things (IoT)
- Precision Agriculture
- Building Automation
- Private wireless Networks

Specification

- Adaptable data rate
- Communication frequency bands: 169, 433, 868, 915MHz
- RX Sensitivity < -145 dBm
- Tx Power -28 to +15 dBm adjustable (Upgradable up to +27dBm)
- Indoor/Urban communication distance >5 km
- Outdoor/LoS communication distance > 50 Km
- Power supply: 3.3 to 5V DC
- Various Analog and Digital inputs/outputs
- Interfaces: I2C, SPI, UART, Isolated RS485, USB, Ethernet Wi-Fi
- Modbus standard communication protocol

Supported data rates and provided Sensitivities

The following table shows the achievable detection SNR for a given symbol rate and the corresponding nominal bitrate.

Nominal bitrate(bps)	Receiver sensitivity (dBm)	Minimum detectable SNR (dB)
2343	-130.5	-6.5
1171	-133.5	-9.5
586	-136.5	-12.5
293	-139.5	-15.5
146	-142.5	-18.6
73	-145	-21.6

We are pleased to be the "Innovation Awards Honoree" of CES® 2023.