

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: 802.15.4z upgrade requirements for larger industrial scenarios

Date Submitted: 20th January 2021

Source: Sven Zeisberg (Zigpos), Jean-Marie André (ST microelectronics)

Contact: Zigpos GmbH, Räcknitzhöhe 35a, 01217 Dresden, Germany

E-Mail: sven.zeisberg {at} zigpos.com, jean-marie.andre {at} st.com

Re: UWB Next Generation

Abstract: Backward compatible evolution of 802.15.4z to harmonize anchor-based scalable 3D location systems

Purpose: Discuss 4z enhancements to address the challenges of larger scale 3D location tracking

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Introduction (1/2)

This contribution is proposing requirements for enhancements of 802.15.4(z) in order to efficiently support larger scale industrial UWB based positioning installations.

- there can be a large number of TAGs (5k+) and many anchor nodes not being in radio reach of each other → efficient radio resource usage, synchronous modes, minimize in-band cmd&ctrl
- objects may move in very large groups → very high number of simultaneous discoveries
- several scenarios & modes of operation (Blinks, GPS like, TWR, ...) → flexibility in trading range/robustness vs. efficient channel usage

Introduction (2/2)

This contribution is proposing requirements for enhancements of 802.15.4(z) in order to efficiently support larger scale industrial UWB based positioning installations... continued

- ISM band operation for OoB cmd&ctrl not always possible → certain in band cmd&ctrl optionally required
- inter radio co-existence management desirable → distributed functionality with standardized information flow may keep efficiency of certain kind of nodes
- inter UWB interference mitigation desirable → scenario detection (self or by system+com) and reaction → flexibility in modes, rates, ranges, channels etc.

Enhancement of 802.15.4z for efficient and diverse larger scale 3D Locating

To address the challenge of a unified location tracking system, one must go beyond the current definition of 4z

- including required additional functionality while keeping 4z backward compatibility
- enabling flexible longer distance measuring range
- allowing efficient scalability for larger positioning networks
- increasing fault tolerance
- allowing efficient in-band mean low rate command & ctrl
- supporting advanced radio co-existence mechanisms

Requirements for efficient and diverse larger scale 3D Precise Locating

3D Precise Location Systems inherently scalable to efficient larger object number installations require:

- providing all optionally required additional functionality while keeping energy efficiency (incl. also asymmetric scenarios) and optimal radio resource allocation for ranging
- allowing simultaneous multi-mode operation
- enabling optional tightly coupled (synch) infrastructure
- supporting efficient (synch) handover / discovery
- supporting fine-grain time slotting