COMMUNICATON APPARATUS AND COMUNICATON METHOD FOR DETECTING AND/OR TRACKING SENSING TARGETS

TECHNICAL FIELD

[0001] The following relates generally to wireless communications, and more specifically, it relates to communication apparatuses and communication methods for detecting and/or tracking sensing targets.

BACKGROUND

[0002] Present specifications of 5G-Advanced (being the next evolution of 5G new radio (NR)) are designed to support enhanced wireless communications between the various network entities and user equipments (UEs). While there are provisions in the specifications to support positioning capabilities, they however do not extend to support detecting/sensing/tracking of objects not connected to the network. If sensing capabilities are integrated into the future specifications of 5G-Advanced, such capabilities are likely to be offered as an add-on service to supplement the enhanced wireless communications.

[0003] In Release 19 (Rel-19) of the 3rd Generation Partnership Project (3GPP) specification, a study item on integrated sensing and communication (ISAC) was agreed to facilitate the studying of channel modeling and deployment scenarios to support object detection and/or tracking for the following types of sensing targets and sensing modes. The sensing targets are: unmanned aerial vehicles (UAVs), humans at indoor and outdoor settings, automotive vehicles (located at least in outdoor setting), automated guided vehicles (e.g. located in indoor factories), and objects that may create hazards on roads/railways (with a minimum size dependent on frequency). The sensing modes are: transmission reception point (TRP) monostatic sensing, user equipment (UE) monostatic sensing, TRP-TRP bistatic sensing, UE-UE bistatic sensing, UE-TRP bistatic sensing, and TRP-UE bistatic sensing, as respectively depicted in FIGs. 2a to 2f.

[0004] Separately, uplink (UL) power control is used in current NR specifications to facilitate effective communications, in which UL power control is based on prior measurements (by a receiver, e.g., at a network entity such as an eNB/gNB) of the received power of a most optimal (best) UL beam (transmitted by a transmitter, e.g., a UE). UL power control enables determination of transmit power for physical uplink shared channel

transmit power related to at least one sensing target and/or at least one sensing mode to a first communication apparatus; a receiver, which in operation, receives reflection of an integrated sensing and communication (ISAC) signal transmitted by the first communication apparatus; and a circuitry, which in operation, detects and/or tracks the at least one sensing target based on the reflection of the ISAC signal.

[0011] According to a 3rd aspect, there is disclosed a method at a first communication apparatus, comprising: determining a transmit power related to at least one sensing target and/or at least one sensing mode for transmission of an integrated sensing and communication (ISAC) signal; and transmitting the ISAC signal based on the determined transmit power.

[0012] According to a 4th aspect, there is disclosed a method at a second communication apparatus, comprising: transmitting control information indicating a transmit power related to at least one sensing target and/or at least one sensing mode to a first communication apparatus; receiving reflection of an integrated sensing and communication (ISAC) signal transmitted by the first communication apparatus; and detecting and/or tracking the at least one sensing target based on the reflection of the ISAC signal.

[0013] Additional benefits and advantages of the disclosed aspects may become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various aspects and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various aspects and to explain various principles and advantages in accordance with the present disclosure

[0015] FIG. 1 is a schematic diagram illustrating an exemplary architecture for a 3GPP new radio (NR) system, in which aspects of the present disclosure may be performed.

[0016] FIGs. 2a to 2f illustrate respective sensing modes available under the concept of integrated sensing and communication (ISAC) as defined by 3GPP, according to prior art.