Claims

1. A first multi-link device (MLD) comprising a first plurality of affiliated stations (STAs), wherein one of the first plurality of STAs is a first sensing initiator and comprises:

a transmitter configured to transmit on a first link a first Sensing Measurement Request frame to a first sensing responder which is one of a second plurality of STAs affiliated with a second MLD, the first Sensing Measurement Request frame including a first Measurement Setup ID; and

a receiver configured to receive on the first link a Sensing Measurement Report frame from the sensing responder, the Sensing Measurement Report frame including the first Measurement Setup ID and a Remaining Feedback Segments field, the Sensing Measurement Report frame being configured to be used for movement detection or distance estimation of one or more target objects that are different from the first MLD and the second MLD.

2. The first MLD of claim 1, wherein another one of the first plurality of STAs is a second sensing initiator and comprises:

a transmitter configured to transmit on a second link a second Sensing Measurement Request frame to a second sensing responder which is another one of the second plurality of STAs affiliated with the second MLD, the second Sensing Measurement Request frame including a second Measurement Setup ID.

3. The first MLD of claim 2, wherein the Sensing Measurement Report frame is an aggregated Sensing Measurement Report frame that includes a plurality of Measurement Report fields and each of the plurality of Measurement Report fields includes a Measurement Setup ID and a Remaining Feedback Segments field.

4. The first MLD of claim 3, wherein the first sensing initiator and the first sensing responder perform a sensing session setup or a sensing measurement setup before performing a Measurement Instance.

5. The first MLD of claim 1, wherein the first MLD is an Access Point (AP) MLD and the second MLD is a non-AP MLD and each of the first plurality of affiliated STAs is an AP, and each of the second plurality of affiliated STAs is a non-AP STA.

6. The first MLD of claim 1, wherein a STA of the first plurality of STAs is configured to transmit a request frame to a STA of the second plurality of STAs to request a measurement setup procedure, the measurement setup procedure comprising a location negotiation and ranging identifier (ID) assignment procedure.

7. The first MLD of claim 1, wherein the first MLD comprises a single interface to upper layer applications, wherein the upper layer applications configure the one or more STAs of the first plurality of affiliated STAs to perform the measurement operations with the one or more STAs of the second plurality of affiliated STAs comprised in the second MLD over one or more links.

8. The first MLD of claim 4, wherein a sensing measurement setup is identified with a same measurement setup identifier (ID) or different measurement setup IDs on one or more of the identified links, and for each of the one or more of the identified links.

9. The first MLD of claim 4, wherein a sensing measurement instance of a sensing measurement setup is identified with a same measurement instance identifier (ID) on one or more of the identified links and wherein for each of the one or more of the identified links:
a link ID of each of the one or more of the identified links together with the measurement instance ID is used to identify a sensing measurement instance specific to each of the one or more of the identified links.

10. The first MLD of claim 4, wherein the first MLD is configured to initiate a sensing measurement instance with the second MLD by transmitting a measurement PHY protocol data unit (PPDU) on a first link of the identified links and requesting a STA affiliated with the second MLD operating on the first link to perform sensing measurements on the measurement PPDU and another STA affiliated with the second MLD operating on a second link of the identified links to transmit a sensing measurement report on the second link,

wherein the sensing measurement report carries a result of the sensing measurement performed on the first link,

and wherein a STA affiliated with the first MLD operating on the second link is configured to receive the sensing measurement report.

11. A method for a first multi-link device (MLD) comprising a first plurality of affiliated stations (STAs), wherein one of the first plurality of STAs is a first sensing initiator and comprises:

transmitting, by the first sensing initiator, on a first link a first Sensing Measurement Request frame to a first sensing responder which is one of a second plurality of STAs affiliated with a second MLD, the first Sensing Measurement Request frame including a first Measurement Setup ID; and

receiving, by the first sensing initiator, on the first link a Sensing Measurement Report frame from the sensing responder, the Sensing Measurement Report frame including the first Measurement Setup ID and a Remaining Feedback Segments field, the Sensing Measurement Report frame being configured to be used for movement detection or distance estimation of one or more target objects that are different from the first MLD and the second MLD.

12. The method of claim 11, wherein another one of the first plurality of STAs is a second sensing initiator and further comprises:

transmitting, by the second sensing initiator, on a second link a second Sensing Measurement Request frame to a second sensing responder which is another one of the second plurality of STAs affiliated with the second MLD, the second Sensing Measurement Request frame including a second Measurement Setup ID.

13. The method of claim 12, wherein the Sensing Measurement Report frame is an aggregated Sensing Measurement Report frame that includes a plurality of Measurement Report fields and each of the plurality of Measurement Report fields includes a Measurement Setup ID and a Remaining Feedback Segments field.

14. The method of claim 13, further comprising performing, by the first sensing initiator and the first sensing responder, a sensing session setup or a sensing measurement setup before performing a Measurement Instance.

15. The method of claim 11, wherein the first MLD is an Access Point (AP) MLD and the second MLD is a non-AP MLD and each of the first plurality of affiliated STAs is an AP, and each of the second plurality of affiliated STAs is a non-AP STA.

16. The method of claim 11, further comprising transmitting, by a STA of the first plurality of STAs, a request frame to a STA of the second plurality of STAs to request a measurement setup procedure, the measurement setup procedure comprising a location negotiation and ranging identifier (ID) assignment procedure.

17. The method of claim 11, wherein the first MLD comprises a single interface to upper layer applications, wherein the upper layer applications configure the one or more STAs of the first plurality of affiliated STAs to perform the measurement operations with the one or more STAs of the second plurality of affiliated STAs comprised in the second MLD over one or more links.

18. The method of claim 14, wherein a sensing measurement setup is identified with a same measurement setup identifier (ID) or different measurement setup IDs on one or more of the identified links, and wherein for each of the one or more of the identified links.

19. The method of claim 14, wherein a sensing measurement instance of a sensing measurement setup is identified with a same measurement instance identifier (ID) on one or more of the identified links and wherein for each of the one or more of the identified links:

a link ID of each of the one or more of the identified links together with the measurement instance ID is used to identify a sensing measurement instance specific to each of the one or more of the identified links.

20. The method of claim 14, wherein the first MLD is configured to initiate a sensing measurement instance with the second MLD by transmitting a measurement PHY protocol data unit (PPDU) on a first link of the identified links and requesting a STA affiliated with the second MLD operating on the first link to perform sensing measurements on the measurement PPDU and another STA affiliated with the second MLD operating on a second link of the identified links to transmit a sensing measurement report on the second link,

wherein the sensing measurement report carries a result of the sensing measurement performed on the first link,

and wherein a STA affiliated with the first MLD operating on the second link is configured to receive the sensing measurement report.