

CLAIMS

1. A method for wireless communication, comprising:
 - determining, at a user-equipment (UE), location information associated with an out of coverage area, the location information being determined based on a location of the UE and data from one or more sensors;
 - reporting the location information to a network entity;
 - receiving, at a first radio access network (RAN) from an access and mobility management function (AMF) network entity, a measurement configuration to start a trace of a UE, wherein the first RAN comprises a first base station;
 - determining a transition of the UE to an inactive state; and
 - sending one or more messages in response to the determination that the UE is in the inactive state, wherein the one or more messages comprises,
 - a RAN paging message to a second RAN indicating to trigger the transition of the UE to a connected state from the inactive state, wherein the second RAN comprises a second base station;
 - a message comprising the measurement configuration to start the trace of the UE to the second RAN;
 - an indication to the AMF network entity that the trace of the UE is deactivated
2. The method of claim 1, wherein:
 - the out of coverage area corresponds to an area without an available satellite positioning system or cell coverage; and
 - the location of the UE corresponds to a location having an available satellite positioning system or cell coverage.
3. The method of claim 1, wherein the one or more sensors comprise at least one of a gyroscope sensor or compass.
4. The method of claim 1, wherein determining the location information comprises calculating a relative location associated with the out of coverage area with respect to the location of the UE via the data from the one or more sensors.

5. The method of claim 1, wherein the data from the one or more sensors indicates at least one of a direction, altitude, or velocity of the UE at one or more points in time between when the UE is in the out of coverage area to when the UE is at the location.
6. The method of claim 1, wherein the location information is reported to the network entity in accordance with a minimization of drive test (MDT) protocol.
7. A method for wireless communication performed by a first radio access network (RAN), comprising:
 - receiving, at the first RAN from an access and mobility management function (AMF) network entity, a measurement configuration to start a trace of a user-equipment (UE), wherein the first RAN comprises a first base station;
 - determining, the first RAN, a transition of the UE to an inactive state; and
 - sending one or more messages in response to the determination that the UE is in the inactive state, wherein the one or more messages comprises:
 - a RAN paging message to a second RAN indicating to trigger the transition of the UE to a connected state from the inactive state, wherein the second RAN comprises a second base station,
 - a message comprising the measurement configuration to start the trace of the UE to the second RAN
 - an indication to the AMF network entity that the trace of the UE is deactivated.
8. The method of claim 7, wherein the measurement configuration comprises a logged minimization of drive test (MDT) configuration.
9. The method of claim 7, wherein the measurement configuration is received from the AMF network entity, and wherein sending the one or more messages comprises sending a message to the AMF network entity that the trace has failed in response to the determination that the UE is in the inactive state.
10. The method of claim 7, further comprising receiving a request from a second RAN to receive context of the UE, wherein sending the one or more messages comprises sending a UE

context response message having the context of the UE to the second RAN in response to the reception of the request.

11. The method of claim 10, wherein the UE context response message indicates the measurement configuration.

12. The method of claim 7, further comprising:
updating a previously cached UE context with the measurement configuration; and
receiving a request from a second RAN for a context of the UE, wherein sending the one or more messages comprises sending a UE context response message having the updated UE context to the second RAN in response to the reception of the request for the context of the UE.

13. The method of claim 12, wherein:
the method further comprises selecting whether to defer the start of the trace until the UE transitions to a connected state or to trigger the transition to the connected state for the trace; and
if the selection comprises selecting to trigger the transition, the sending of the one or more messages further comprises sending a RAN paging message to the second RAN to trigger the transition of the UE to the connected state prior to the reception of the request for the context of the UE.

14. The method of claim 13, wherein the selection is based on an indication from the AMF network entity or based a context of the UE.

15. The method of claim 7, wherein:
sending the one or more messages comprises sending a message to configure the measurement configuration, the measurement configuration comprising an immediate MDT configuration;
the determination comprises determining that the UE has transitioned to the inactive state while configured with the immediate MDT configuration; and

sending the one or more message comprises sending an indication to the AMF network entity that the trace is deactivated based on the determination.

16. The method of claim 7, wherein:

the measurement configuration comprising an immediate MDT configuration;

the determination comprises determining that the UE has transitioned to the inactive state while configured with the immediate MDT configuration;

the method further comprises:

storing the immediate MDT configuration based on the determination; and

configuring the UE to resume the trace after the UE has entered a connected state.

17. The method of claim 7, wherein:

sending the one or more messages comprises sending a message to coordinate the trace of the UE with the measurement configuration received from the AMF network entity;

the measurement configuration comprises a logged MDT configuration; and

if the UE transitions to the inactive state while configured with the logged MDT configuration, the logged MDT configuration is valid only while the UE is within an area scope set by the AMF network entity in the measurement configuration.

18. The method of claim 17, further comprising configuring the UE with a RAN notification area (RNA), wherein the logged MDT configuration is further valid only while the UE is within the RNA.

19. The method of claim 7, wherein:

the measurement configuration comprises a configuration for a logged MDT; and

the method further comprises configuring the UE with a RAN notification area (RNA) when the UE transitions to the inactive state; and

sending the one or more message comprises sending a radio resource control (RRC) release message to the UE for the transition of the UE to the inactive state, the RRC release message configuring the logged MDT if the UE is within the RNA.

20. The method of claim 7, wherein receiving, at the first RAN, a measurement configuration to start a trace of a user-equipment (UE) comprises:

receiving a message having a measurement configuration to start a trace of a UE, the UE being in an inactive state.

21. The method of claim 20, wherein the message comprising the measurement configuration further comprises a trace start message from the AMF network entity, the method further comprising sending a path switch request to the AMF prior to receiving the trace start message.

22. The method of claim 20, further comprising sending a UE context request message to a radio access network (RAN), wherein:

the message comprising the measurement configuration further comprises a UE context response message received after the UE context request message is sent; and

the method further comprises transmitting a radio resource control (RRC) resume message to the UE after receiving the UE context response message.

23. The method of claim 22, further comprising:

sending a path switch request to the AMF network entity after transmitting the RRC resume message; and

receiving a trace start message from the AMF network entity after sending the path switch request.

24. The method of claim 23, wherein the trace start message is received after the other message having the measurement configuration is transmitted to the UE.

25. The method of claim 22, further comprising:

receiving a RAN paging message; and

transmitting a paging message to the UE to transition the UE from the inactive state to a connected state prior to the transmission of the other message having the measurement configuration.

26. The method of claim 22, further comprising receiving a RRC resume message from the UE, the UE context request message being sent after the RRC resume message is received.