

CLAIMS

1. A method of wireless communications by a user equipment (UE), comprising: communicating with and camping on a next generation node B (gNB) in a 5G new radio (NR) system; initiating a voice call with the gNB; receiving a 5G NR-to-long term evolution (LTE) handover command in response to initiating the voice call; performing a handover procedure in response to the handover command; detecting a failure in the handover procedure; and taking one or more actions in response to detecting the failure in the handover procedure, wherein taking the one or more actions comprises: returning to camp on the gNB in the 5G NR system when the UE has not received, from the gNB, at least one of: an NR-to-LTE voice fallback indicator; or an indication of evolved packet system (EPS) or inter-radio access technology (RAT) fallback support; and attempting a handover procedure with one or more secondary LTE cells after returning to camp on the gNB.
2. The method of claim 1, wherein taking one or more actions comprises performing a cell selection or re-selection procedure to determine a new cell to camp on, wherein performing the cell selection or re-selection procedure comprises excluding the gNB from being selected based on information indicating the 5G NR system does not support voice calls; and further comprising receiving the information in a registration accept message associated with the 5G NR system, wherein the information is received from an access management function (AMF) associated with the 5G NR system.
3. The method of claim 1, wherein taking one or more actions comprises performing a cell selection or re-selection procedure to determine a new cell to camp on, wherein performing the cell selection or re-selection procedure comprises excluding the gNB from being selected based on an NR-to-LTE voice fallback indicator received in the handover command, wherein the fallback indicator provides an indication that gNB does not support the voice call and excluding the gNB is based on the indication that the gNB does not support the voice call.
4. The method of claim 1, further comprising detecting that the handover command is received in response to the initiated voice call based on a timing relationship between when the voice call was initiated and when the handover command was received.
5. The method of claim 1, wherein taking one or more actions comprises performing an LTE cell search.
6. The method of claim 5, wherein: the LTE cell search is performed according to a first timer; and when the first timer expires before an LTE cell is found, taking one or more actions further comprises: performing at least one of a WCDMA cell search or GSM cell search to handle the voice call according to a second timer; and returning to camping on the gNB when the second timer expires before a WCDMA cell or a GSM cell is found.
7. The method of claim 6, wherein taking one or more actions further comprises: camping on one of a WCDMA cell based on the WCDMA cell search or a GSM cell based on the GSM cell search; and receiving an indication of a Session Transfer Number for Single Radio Voice Call Continuity (STN-SR) for handling the voice call in at least one of: a registration accept message received from the 5G NR system; a SIP message; or configuration information stored in the UE; and using the STN-SR to handle the voice call in a circuit switched domain.

8. The method of claim 1, wherein the initiated voice call is one of a mobile originating voice call or a mobile terminating voice call.

9. The method of claim 1, wherein: the handover command comprises a handover command, a re-direction command, or any other command directing the UE from NR to LTE.

10. An apparatus for wireless communications by a user equipment (UE), comprising: at least one processor configured to: communicate with and camp on a next generation node B (gNB) in a 5G new radio (NR) system; initiate a voice call with the gNB; receive a 5G NR-to-long term evolution (LTE) handover command in response to initiating the voice call; perform a handover procedure in response to the handover command; detect a failure in the handover procedure; and take one or more actions in response to detecting the failure in the handover procedure, wherein: in order to take the one or more action, the at least one processor is further configured to: return to camp on the gNB in the 5G NR system when the UE has not received, from the gNB, at least one of: an NR-to-LTE voice fallback indicator; or an indication of evolved packet system (EPS) or inter-radio access technology (RAT) fallback support; and attempt a handover procedure with one or more secondary LTE cells after returning to camp on the gNB; and a memory coupled with the at least one processor.

11. The apparatus of claim 10, wherein: in order to take the one or more actions, the at least one processor is further configured perform a cell selection or re-selection procedure to determine a new cell to camp on; in order to perform the cell selection or re-selection procedure, the at least one processor is further configured to exclude the gNB from being selected based on information indicating the 5G NR system does not support voice calls; and the at least one processor is configured to receive the information in a registration accept message from an access management function (AMF) associated with the 5G NR system.

12. The apparatus of claim 10, wherein: in order to take the one or more actions, the at least one processor is further configured perform a cell selection or re-selection procedure to determine a new cell to camp on; in order to perform the cell selection or re-selection procedure, the at least one processor is further configured to exclude the gNB from being selected based on an NR-to-LTE voice fallback indicator received in the handover command; the fallback indicator provides an indication that gNB does not support the voice call; and the at least one processor is configured to exclude the gNB based on the indication that the gNB does not support the voice call.

13. The apparatus of claim 10, wherein the at least one processor is further configured to detect that the handover command is received in response to the initiated voice call based on a timing relationship between when the voice call was initiated and when the handover command was received.

14. The apparatus of claim 10, wherein, in order to perform the one or more actions, the at least one processor is further configured to perform an LTE cell search.

15. The apparatus of claim 14, wherein: the at least one processor is further configured to perform the LTE cell search according to a first timer; and when the first timer expires before an LTE cell is found, in order to perform the one or more actions, the at least one processor is further configured: perform at least one of a WCDMA cell search or GSM cell search to

handle the voice call according to a second timer; and return to camping on the gNB when the second timer expires before a WCDMA cell or a GSM cell is found.

16. The apparatus of claim 15, wherein, in order to perform the one or more actions, the at least one processor is further configured to: camp on one of a WCDMA cell based on the WCDMA cell search or a GSM cell based on the GSM cell search; and receive an indication of a Session Transfer Number for Single Radio Voice Call Continuity (STN-SR) for handling the voice call in at least one of: a registration accept message received from the 5G NR system; a SIP message; or configuration information stored in the UE; and use the STN-SR to handle the voice call in a circuit switched domain.

17. The apparatus of claim 10, wherein the initiated voice call is one of a mobile originating voice call or a mobile terminating voice call.

18. The apparatus of claim 10, wherein: the handover command comprises a handover command, a re-direction command, or any other command directing the UE from NR to LTE.

19. A method for wireless communication by a base station, comprising: communicating with a user equipment (UE) in a 5G new radio (NR) system; initiating a voice call with the UE; transmitting a 5G NR-to-long term evolution (LTE) handover command in response to initiating the voice call; reestablishing communication with the UE, after a handover procedure based on the handover command fails, if the base station has not transmitted, to the UE, at least one of: an NR-to-LTE voice fallback indicator; or an indication of evolved packet system (EPS) or inter-radio access technology (RAT) fallback support; and attempting to handover the UE to one or more secondary LTE cells after the handover procedure fails and the communication with the UE is reestablished.

20. The method of claim 19, further comprising including an NR-to-LTE voice fallback indicator in the handover command, wherein the fallback indicator provides an indication that base station does not support the voice call.

21. The method of claim 19, wherein the handover command comprises a handover command, a re-direction command, or any other command directing the UE from NR to LTE.

22. An apparatus for wireless communication by a base station, comprising: at least one processor configured to: communicate with a user equipment (UE) in a 5G new radio (NR) system; initiate a voice call with the UE; and transmit a 5G NR-to-long term evolution (LTE) handover command in response to initiating the voice call; reestablish communication with the UE, after a handover procedure based on the handover command fails, if the base station has not transmitted, to the UE, at least one of: an NR-to-LTE voice fallback indicator; or an indication of evolved packet system (EPS) or inter-radio access technology (RAT) fallback support; and attempt to handover the UE to one or more secondary LTE cells after the handover procedure fails and the communication with the UE is reestablished; and a memory coupled with the at least one processor.

23. The apparatus of claim 22, wherein the at least one processor is further configured to include an NR-to-LTE voice fallback indicator in the handover command, wherein the fallback indicator provides an indication that base station does not support the voice call.

24. The apparatus of claim 22, wherein the handover command comprises a handover command, a re-direction command, or any other command directing the UE from NR to LTE.