3GPP SA WG1 Meeting #96e
Electronic Meeting, 8 – 18 Nov 2021

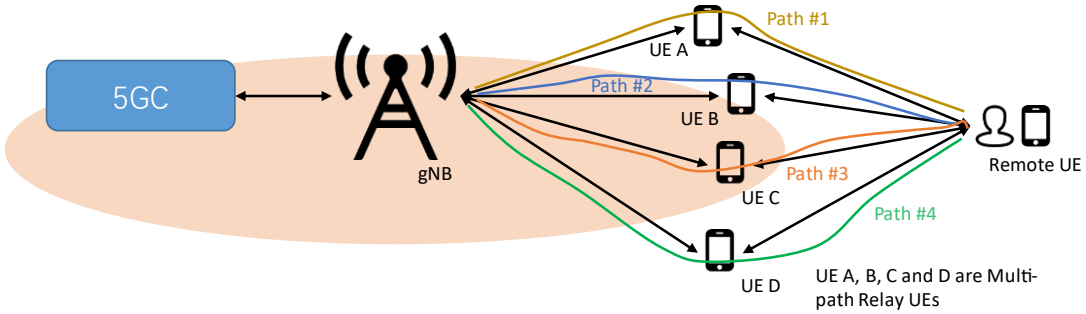
S1-214127

Study on Enhanced Relay Communication with High Reliability and High Data Rate

China Telecom

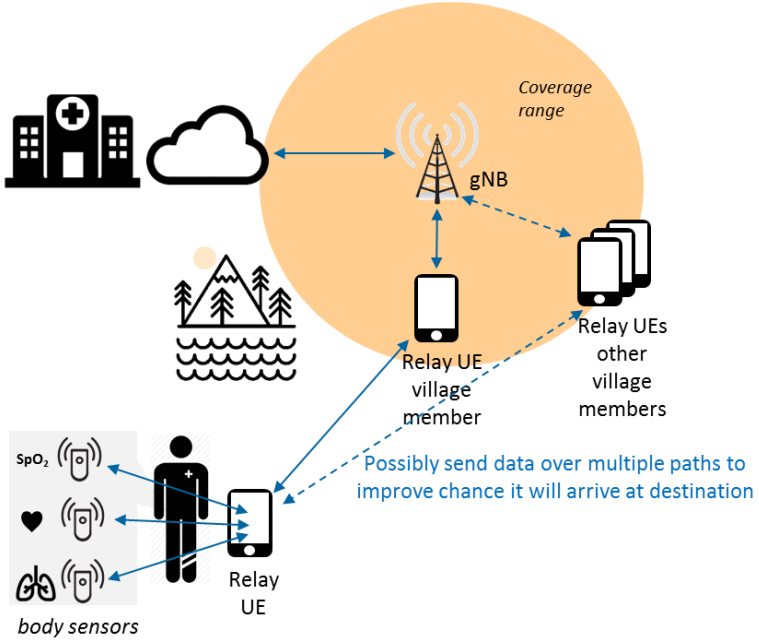
Motivations

- High frequency becomes widely used. The higher the frequency, the smaller the coverage. Cellular coverage could be extended by relays to ensure user experience,
- Less cost for operators, comparing to installing base stations,
- Users could have better user experience, e.g. service continuity,
- Relay owners could benefit from incentives scheme offered by operators,
- With multiple paths, the communication would be more reliable,
- With multiple paths transmitting different data simultaneously, user could have higher data rate.



Related Use Case in Previous Release

TR 22.866 Subclause 5.7 Use case for rural areas connected healthcare



Reference: 3GPP TR 22.866: "Enhanced Relays for Energy Efficiency and Extensive Coverage"

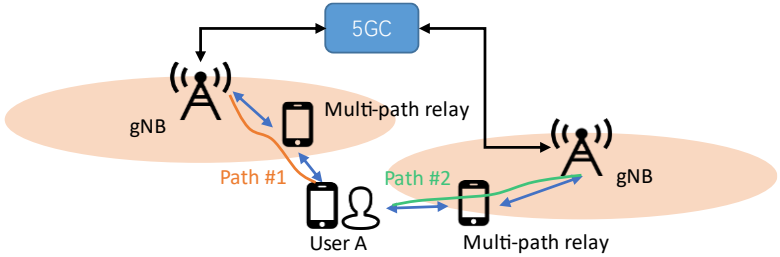
- In this use case, data is sent over multiple paths to ensure that it could be sent to the hospital because the cellular coverage is limited or absent.
- In this use case, the scenario when different data packets from one UE transmitted through different paths is not taken into account.
- With multi-path relay, the connection between the remote UE and gNB has multiple paths. Within each path, there could be one-hop relay or multi-hop relays. In this study, only multi-path one-hop relay is considered.
- In this study, we would consider different use cases for multi-path one-hop relay including transmitting same data and different data packet from one UE simultaneously.

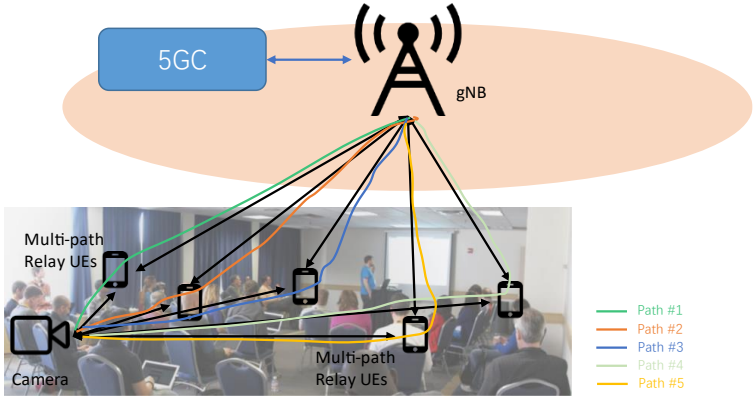
Example Use Cases

Extended coverage with multi-path one-hop relay

The higher frequency we used, the coverage would be smaller. If we don't have full coverage, user might get into the area that has no coverage as shown in the figure on the right.

If we have two multi-path relays within the coverage range of two gNBs, we could have user connected to the relays which are relatively closer to obtain cellular connection.





☐ School or Hospital

- At school, the live video and audio recorded by the camera could be transmitted through student's phones as multi-path relay to provide fast and clear online course for students on remote degree program.
- AR/VR assisted remote surgery requires high data rate, the connections between the AR/VR devices and 5GC could be through the multi-path relay to achieve high data rate.

☐ City Center or Busy Area

- At the city center or busy area during special events (e.g. Christmas market), the cellular coverage would be poor. With different relays from multiple paths, user could get good coverage and could share videos that has good quality with his family.

Proposed objectives and Related Work Items

- The objectives of this study are to define:
  - Use cases and corresponding requirements on multi-path one-hop relay,
  - Other aspects, including charging and security,
  - Gap between the identified requirements for multi-path one-hop relay and the existing requirements for 5G system.
- Related Work Items:
  - New Services and Markets Technology Enablers (SMARTER)
  - Enhanced Relays for Energy Efficiency and Extensive Coverage (REFEC)

Note: The scenario being discussed in the RAN group when involving both path with relay in between the remote UE and gNB and path without relay is not considered in this study. Only scenario when all the paths have relay in between the remote UE and gNB is considered.

THANKS