

3GPP SA WG1 #97-e
Electronic Meeting, 14 – 24 Feb. 2022



Discussion on Passive IoT

S1-220028

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Passive IoT Communication

- **Passive IoT devices** transmit their information by modulating RF signals transmitted by other devices or signals from the environment.
- **The energy sources** for Passive IoT devices include dedicated RF signals, environmental energy such as RF signals in the environment, solar energy, vibration, thermal energy, etc.
- **Typical example** of commercialization
 - RFID system

Problems and challenges

- Low communication rate
- High OPEX for manual scanning
- Large number of devices accessing
- Self interference cancellation
- Limited coverage – short communication distance
- Intermittent communication – perform energy harvest before communication

Typical Application Scenarios of Passive IoT Communication

Wide area coverage scenarios

logistics tracking



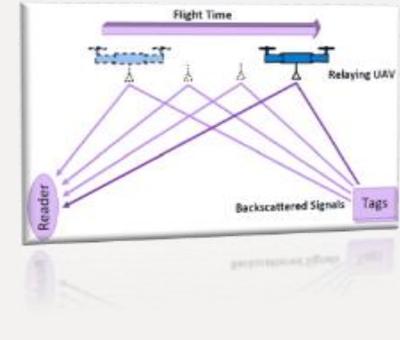
environmental monitoring, smart agriculture



railroad operation and maintenance



UAV inspection



Local area/local coverage scenarios

smart home



low-power health monitoring



low-power backhaul of wearable devices



industrial sensor network



biochips



Smart Home using Passive IoT technology

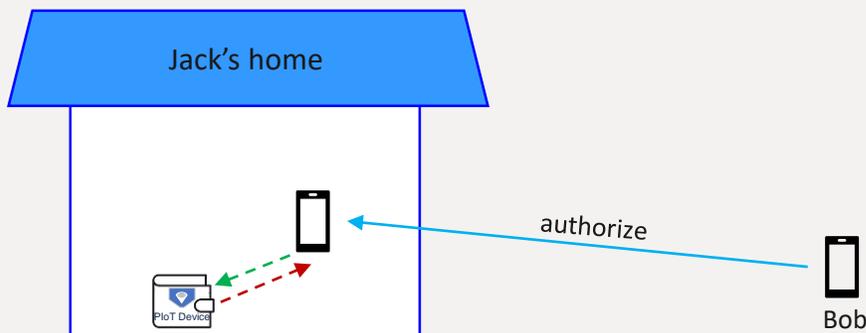
Applicable scenarios:

- Personal belongings positioning, similar to Airtag function;
- Personal health monitoring or sensors.



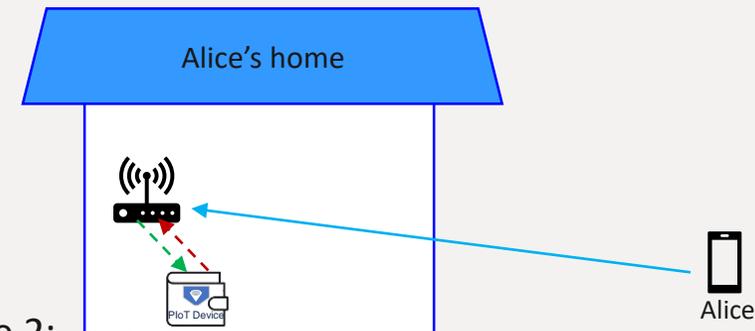
Use case 1:

Smartphone gives an alarm when the Passive IoT device is far away.



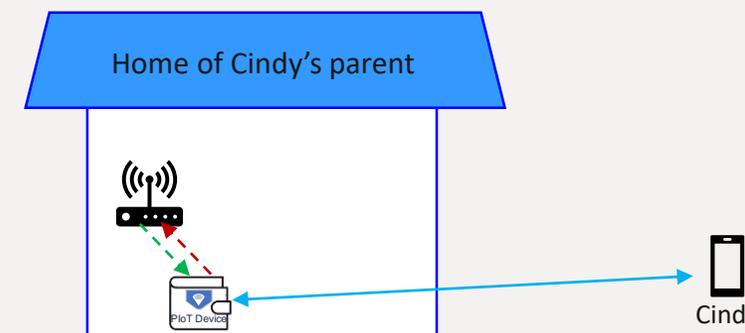
Use case 3:

Bob visited Jack's home this afternoon. When he comes back to his home, he cannot find his wallet. He authorizes Jack to help him to find his wallet (attached with a Passive IoT device).



Use case 2:

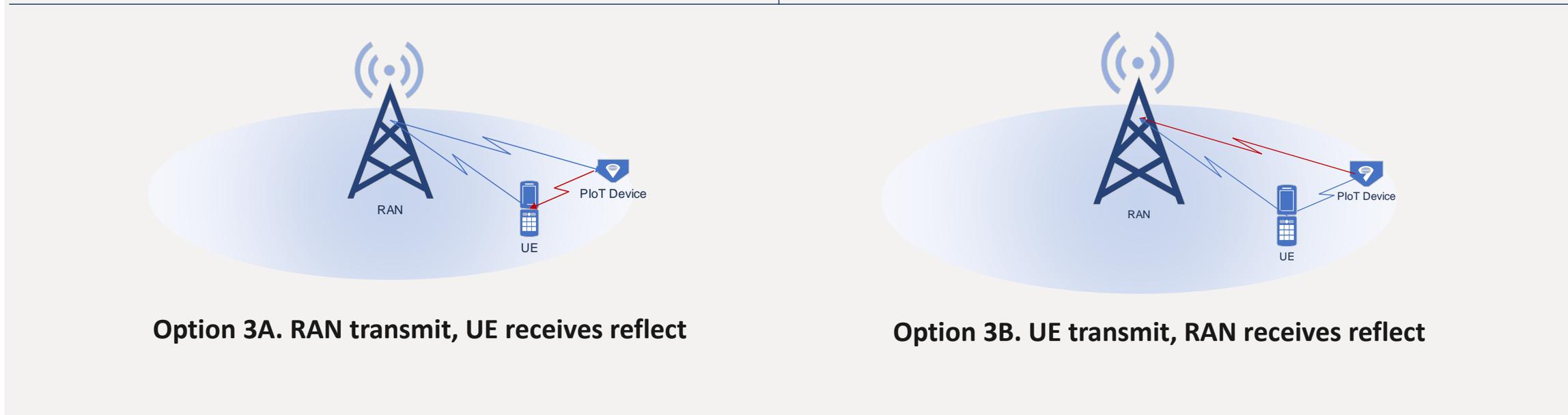
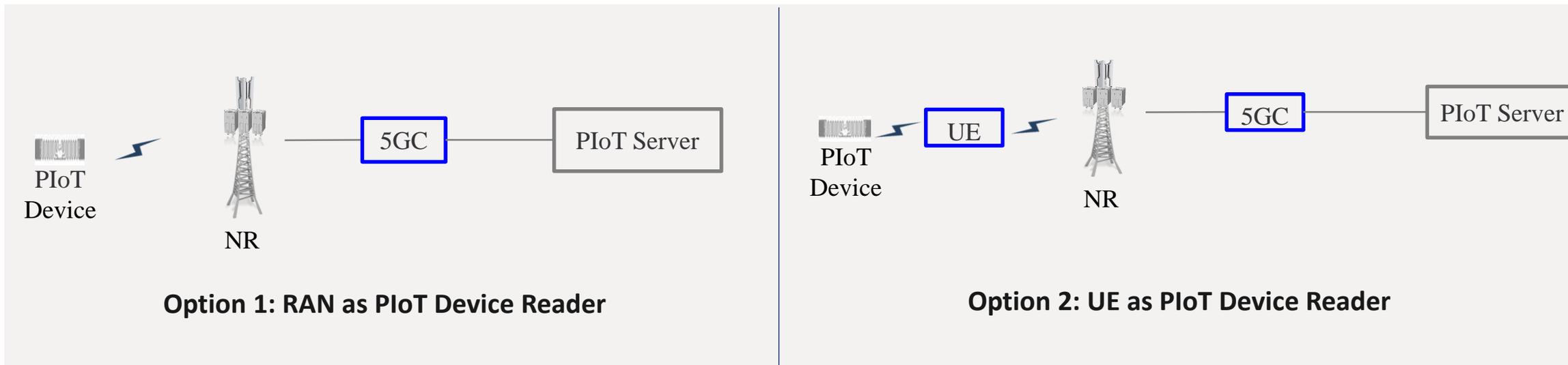
When Alice is applying for a credit card in a bank, she cannot find her ID card. She checks whether her ID card (attached with a Passive IoT device) is within her home using her Smartphone.



Use case 4:

Cindy does not live with her parents. But she would like to check her parent's health condition by accessing the health condition devices in her parent's home (attached with a Passive IoT device).

Potential architecture enhancements



Different architecture enhancements may be explored for different use cases.

Potential 5G system enhancements

- Lightweight protocol stack
- Simplified connection control
- Mobility management based on differentiated scenarios
- Flexible session management
- Efficient access control
- Transmission security

THANK YOU.

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