



# Introducing Channel Sounding

Secure, fine ranging with Bluetooth technology

Lori Lee

Director, Marketing, APAC& China

Bluetooth SIG, Inc.

# Bluetooth Special Interest Group (SIG)

- Oversees Bluetooth® technology and associated trademarks
- Not-for-profit membership organization formed in 1998



Standards Development  
Organization

**50+**

Average number of  
enhancement projects  
underway at any given time



Product Certification  
Body

**70K+**

new products completed  
the Bluetooth Qualification  
Process in 2022 alone



Patent and Trademark  
License Administrator

**40K+**

companies party to the  
Bluetooth® technology  
cross license

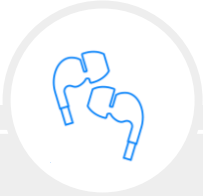


Industry Trade  
Association

**5B+**

Bluetooth enabled  
products ship each year

# Bluetooth® technology is a solutions-oriented



## Audio Streaming

Wireless Headsets  
Wireless Speakers  
In-Car Systems

**1.3**  
**billion**

Annual device shipments



## Data Transfer

Sports & Fitness  
PC Peripherals & Accessories  
Health & Wellness

**1.9**  
**billion**

Annual device shipments



## Location Services

Personal Item Finding  
Asset Tracking  
Digital Key

**563**  
**million**

Annual device shipments



## Device Network

Networked Lighting Control  
Monitoring Systems  
Electronic Shelf Labels

**1.7**  
**billion**

Annual device shipments

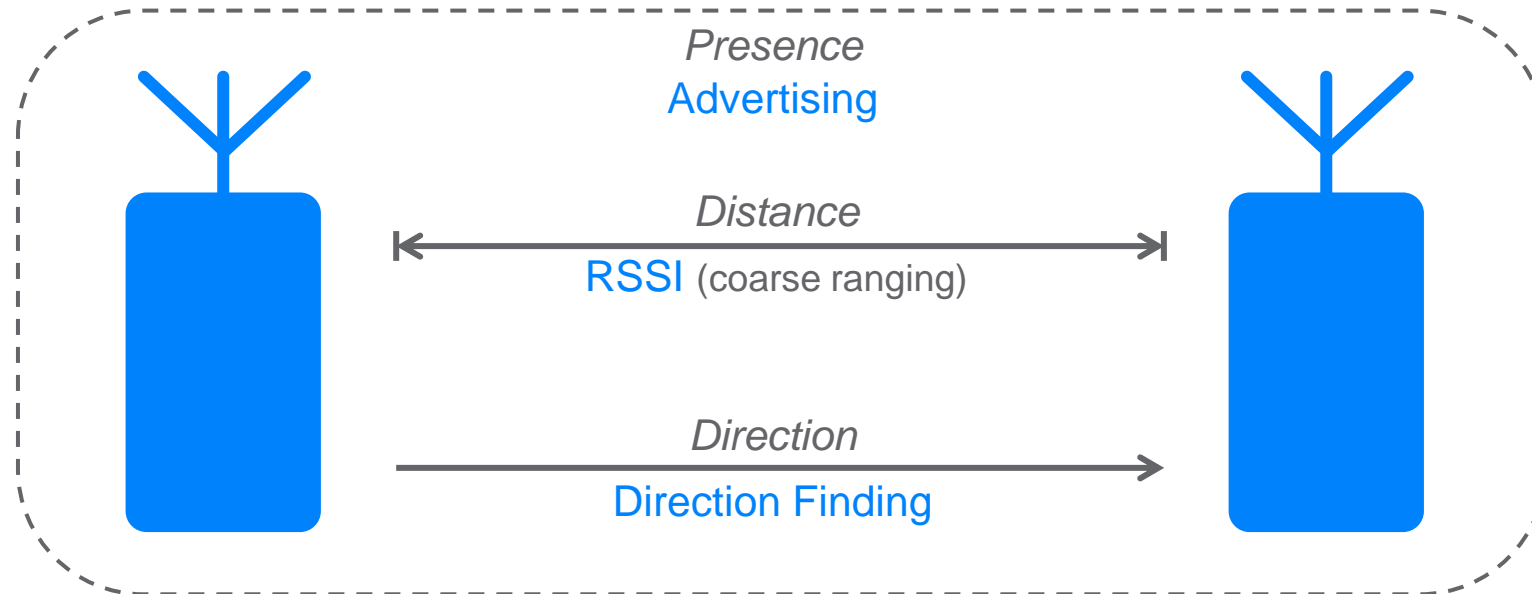


2028



# Bluetooth® device positioning features

Enable one device to determine the presence, distance, and direction of another



# Bluetooth® RSSI

Adds basic distance awareness to Bluetooth connected devices

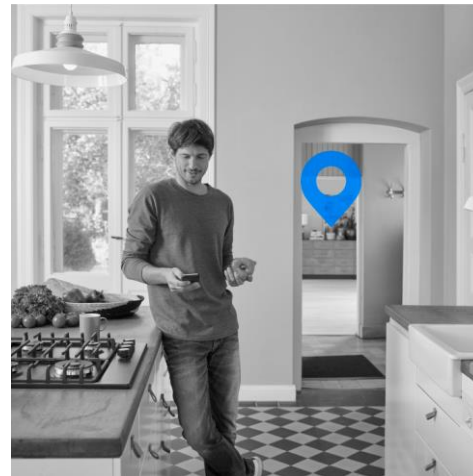


## Digital Key

Places: Cars, homes, and offices

Things: Safes, cabinets, and locks

*RSSI enhances security*



## 'Find My' Solutions

Apple, Google, Samsung, etc.

Tags and supporting devices

*RSSI enhances locating*



## Human Machine Interface

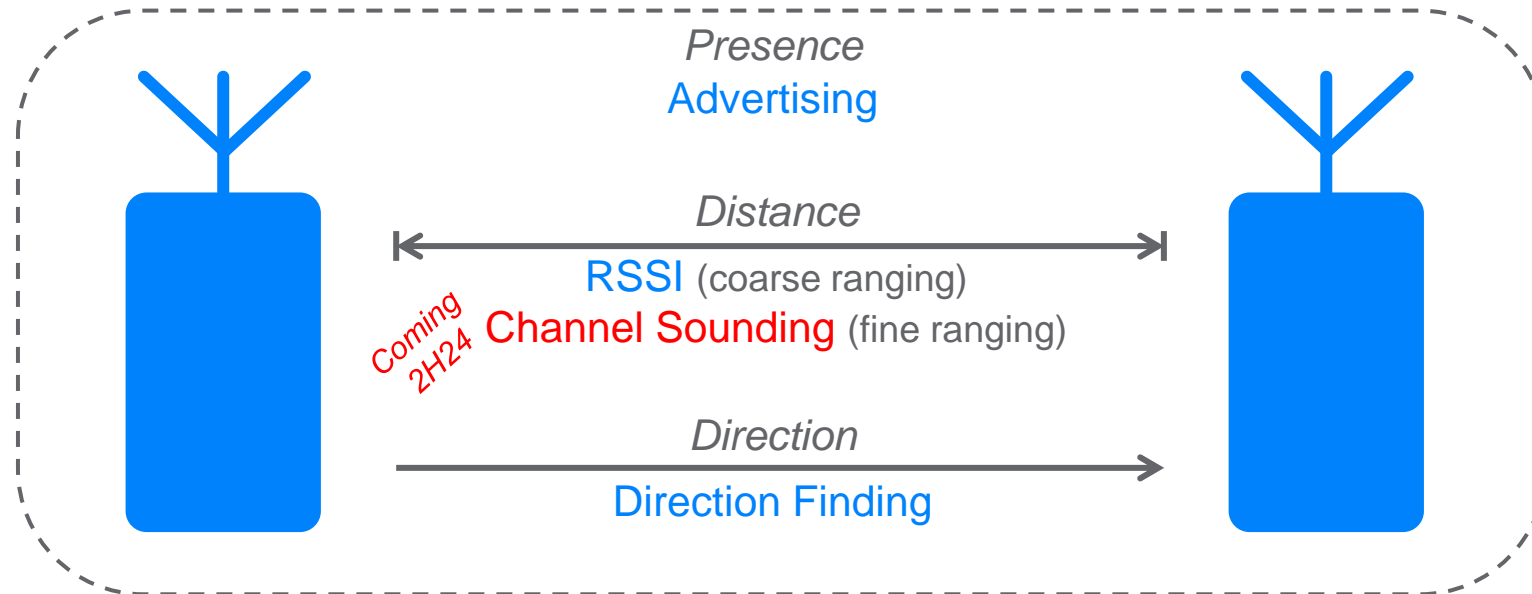
Industrial devices and machines

Home appliances

*RSSI enhances safety*

# Introducing Bluetooth® Channel Sounding

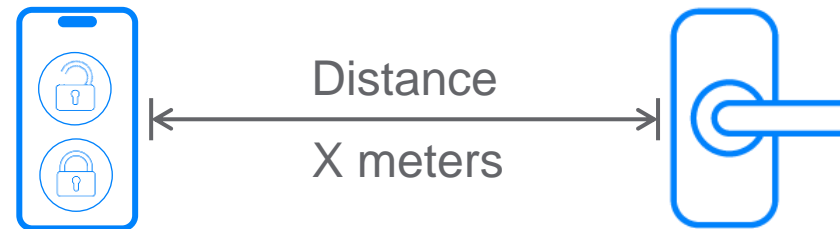
Enable one device to determine the presence, distance, and direction of another



# Bluetooth® Channel Sounding

## Fine ranging between two Bluetooth devices

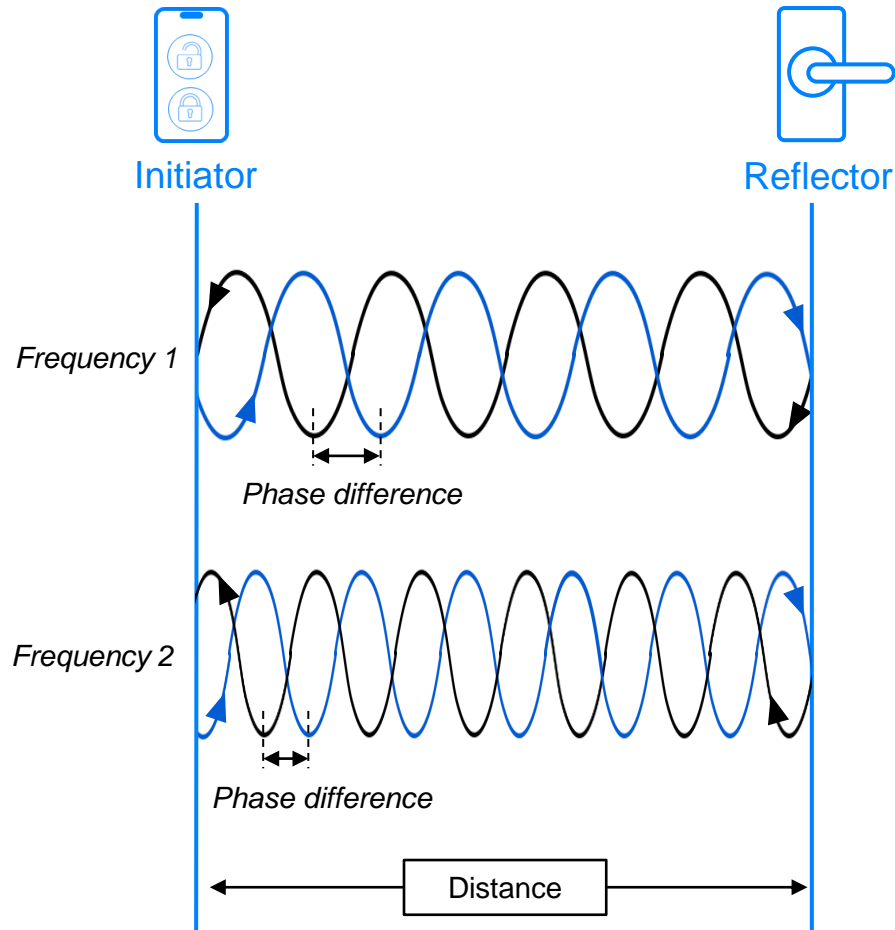
- Based on Phase-Based Ranging, a well proven method
- Enables high accuracy distance measurements



Target accuracy: +/- 10% of actual distance

*Early implementations showing +/- 0.5m up to 50m*

# Bluetooth® Channel Sounding



## How phase-based ranging works

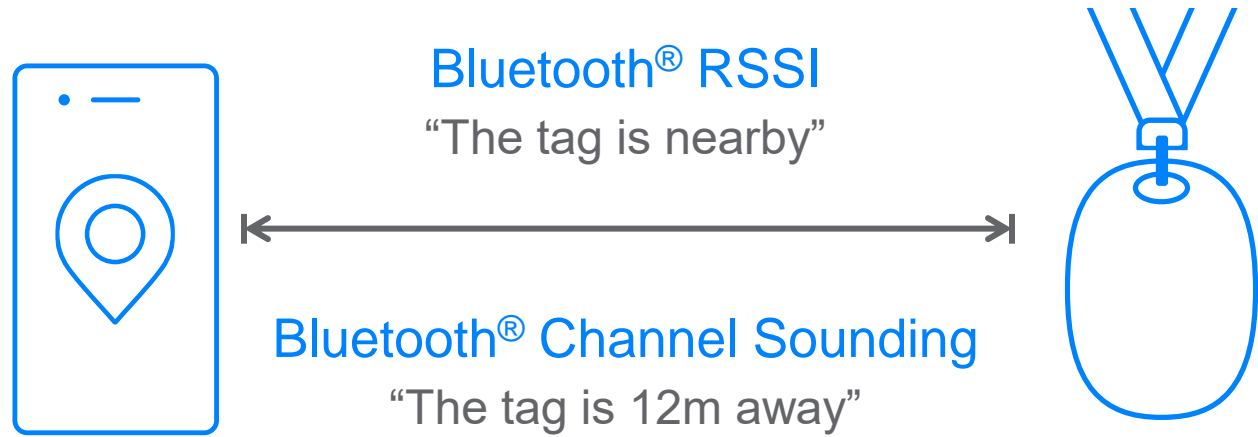
- An *Initiator* device sends a signal to a *Reflector* device, which returns the signal at its received phase
- Upon receiving the returned signal, the Initiator calculates the distance using the phase difference
- The process is repeated on one or more additional frequencies to increase measurement accuracy





# Use Case: 'Find My'

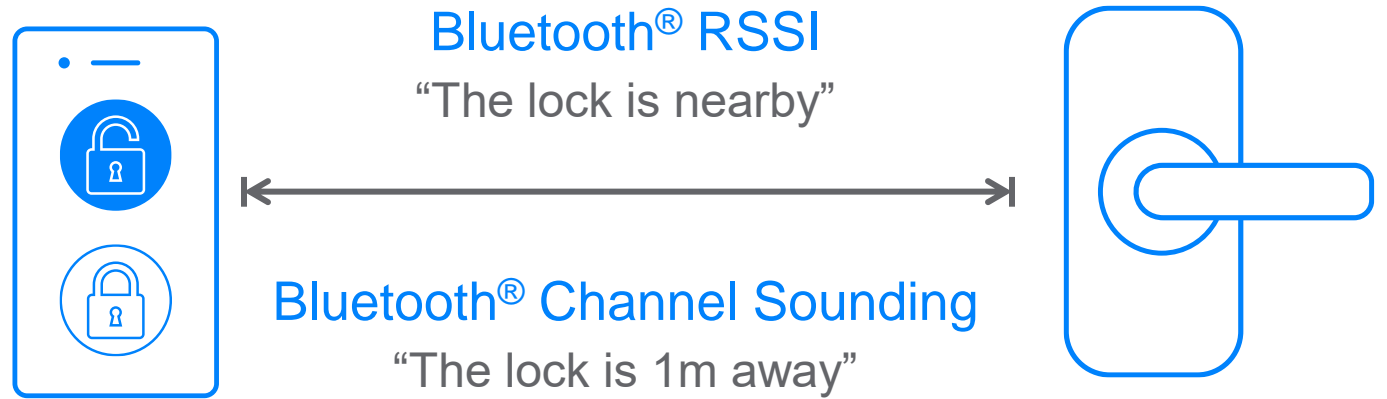
True distance awareness can improve the user experience of item finding solutions





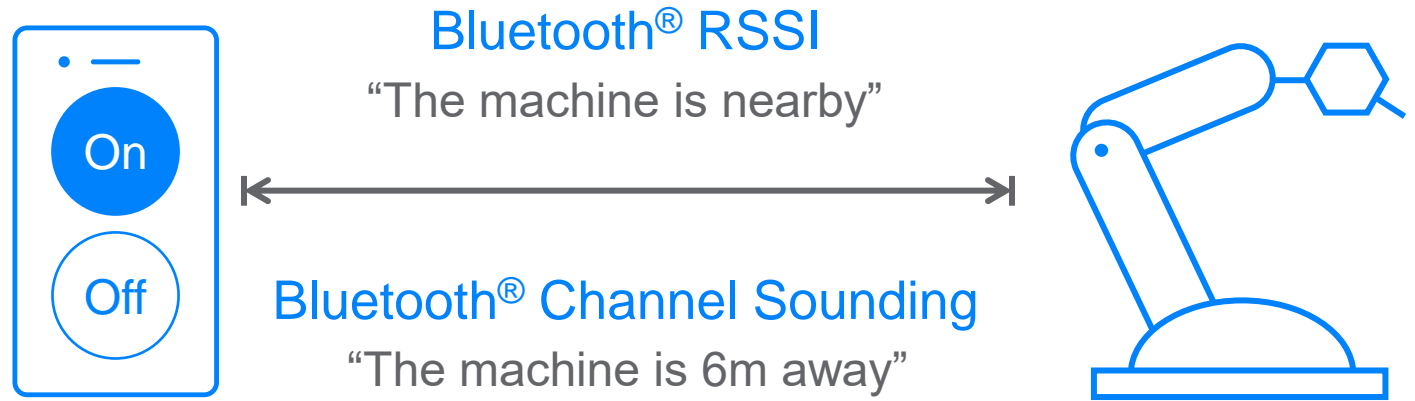
# Use Case: Digital key

True distance awareness can improve the security of digital key solutions



# Use Case: Human machine interface

True distance awareness can improve the safety of HMI solutions



# Other major upcoming Bluetooth features



## Channel Sounding

- Targeting  $< \pm 10\%$  of actual
- Will enhance locating solution
  - Digital key solutions
  - Asset tracking systems
  - Human Machine Interface



## Higher Data Throughput

- Bluetooth LE up to 8 Mbps
- Will enhance many use cases
  - More, higher quality audio streams
  - Faster data synchronization
  - More responsive controllers



## Bluetooth LE in Higher Bands

- Targeting 5 and 6 GHz bands
- Will enable the next 25 years
  - Even higher speeds
  - Even lower latency
  - Even better coexistence



## Summary

- Bluetooth® is a leading positioning technology
- New Channel Sounding feature coming in 2H24
- Will enable secure, fine ranging between devices
- Will enhance many existing Bluetooth use cases
  - Security of Digital Key solutions
  - Accuracy of Locating solutions
  - Safety of HMI solutions

# Bluetooth SIG Social Accounts

WeChat



Weibo





# Thank you!

*LinkedIn:*

