

A nighttime cityscape with several tall skyscrapers and light trails from traffic, creating a sense of motion and urban energy.

# CoreHW

HARD CORE  
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SOLUTIONS

## CorePatch Antenna Board for BT5.1 Angle-of-Arrival / Angle-of-Departure Solutions

May 2021

## Bluetooth® 5.1 Angle-of-Arrival (AoA)/ Angle-of-Departure (AoD) Location Services

Bluetooth 5.1 AoA/AoD enables effective Direction Finding with sub 1m location accuracy

Affordable technology for large scale deployment

Angle-of-Arrival locators and Angle-of-Departure beacons require

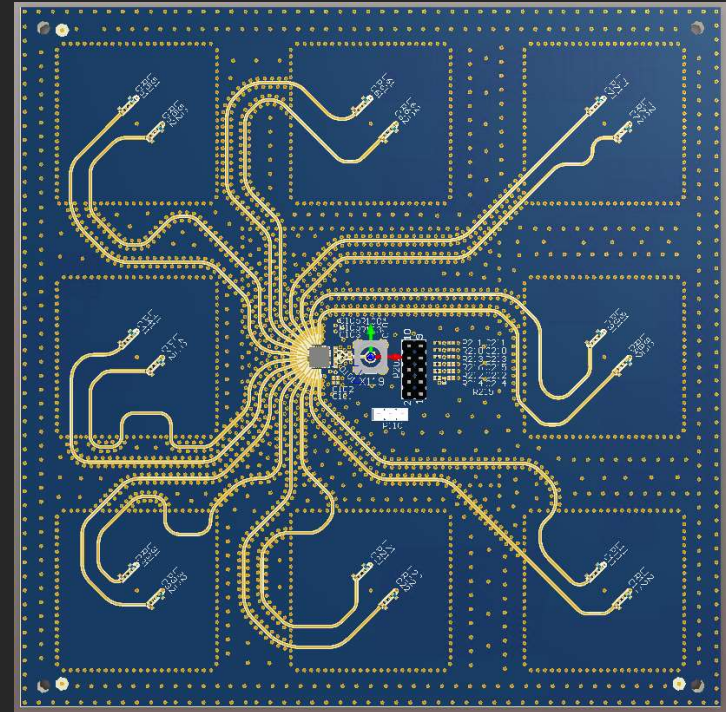
- Bluetooth transceiver
- Antenna Array, 8-32 antennas
- AoX optimized Antenna Switch

### • Applications

- Asset tracking in factories, offices, logistics etc.
- Access control
- People tracking
- Wayfinding
- Point-of-interest services
- Proximity marketing
- Shopping guidance and assistance
- Equipment and facilities utilization
- Consumer behavior analysis
- Security services
- Item finding

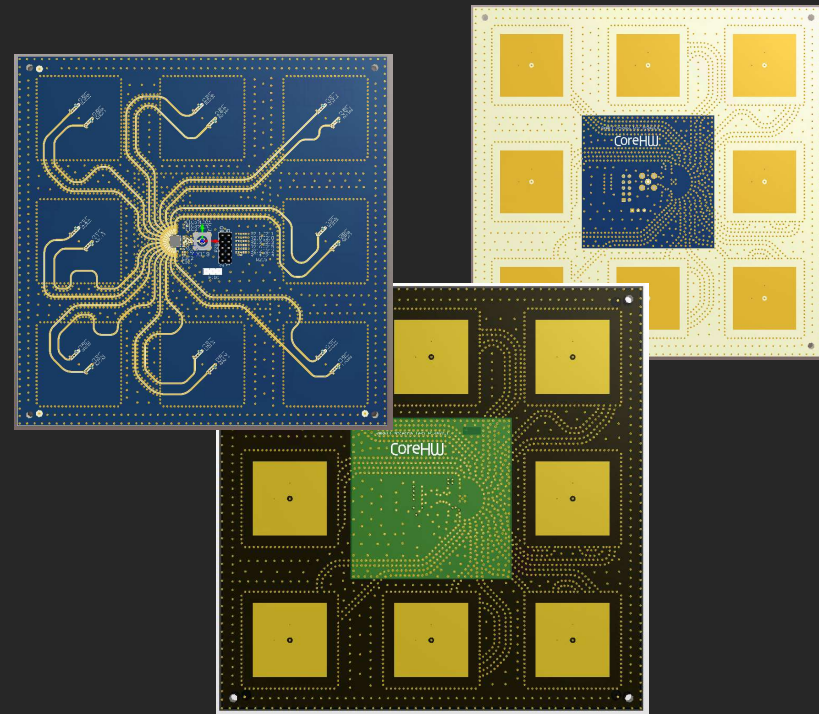
## CorePatch Antenna Boards

- 8 dual polarized antennas with dual RF feeds
- Switching with CHW1010 antenna switch
- Low cost 4-layer patch array
- 15\*15cm size
- Optimized phase balance between antenna chains
- Excellent angle accuracy
- Easy to manufacture
- No need for calibration during production
- Can be customized to other form factors
- Firmware support and antenna models available



## CorePatch Antenna Boards

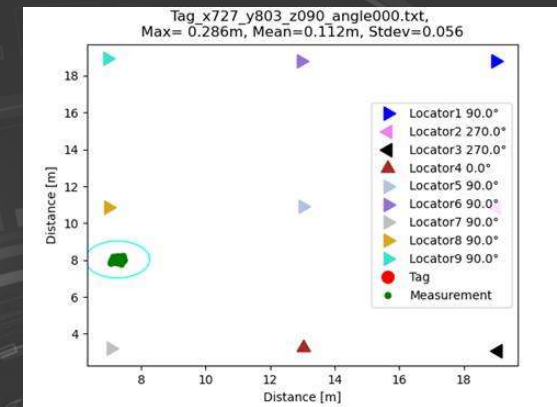
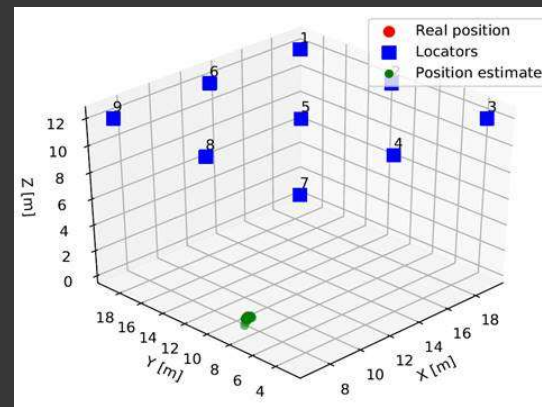
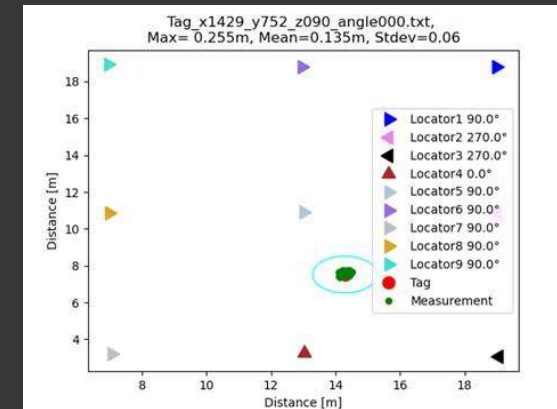
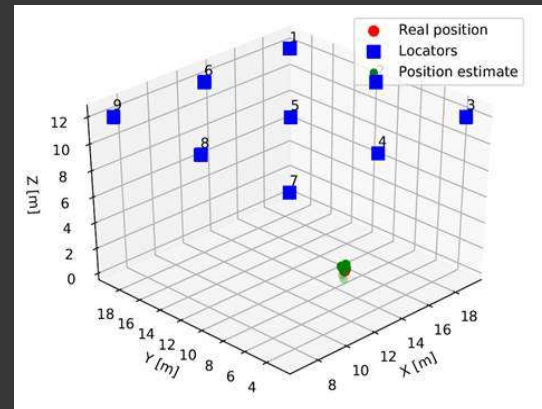
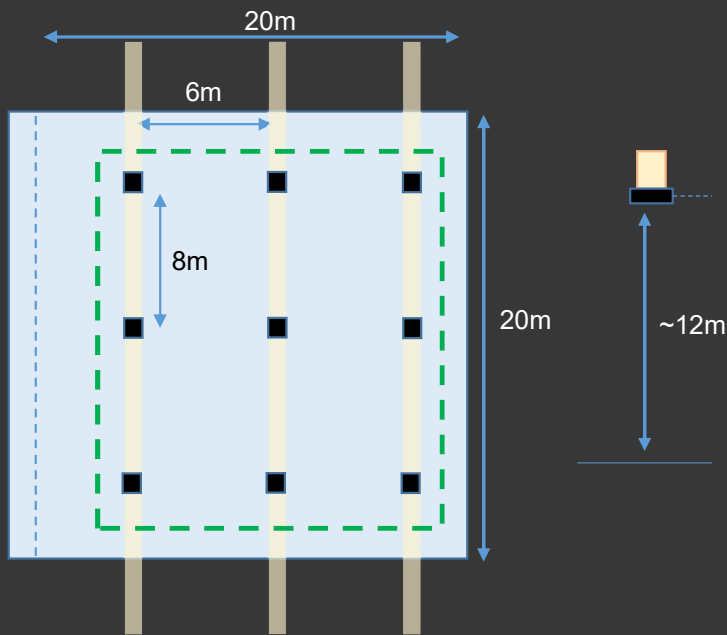
- Several CorePatch variants
- Extensive testing completed
  - Anechoic chambers
  - Lab characterization
  - As part of end-to-end location solution
- CorePatch antenna boards enable a system solution which
  - is insensitive to multi-path signals
  - has position accuracy down to sub 0.5m level
  - is easy and cost-efficient to produce





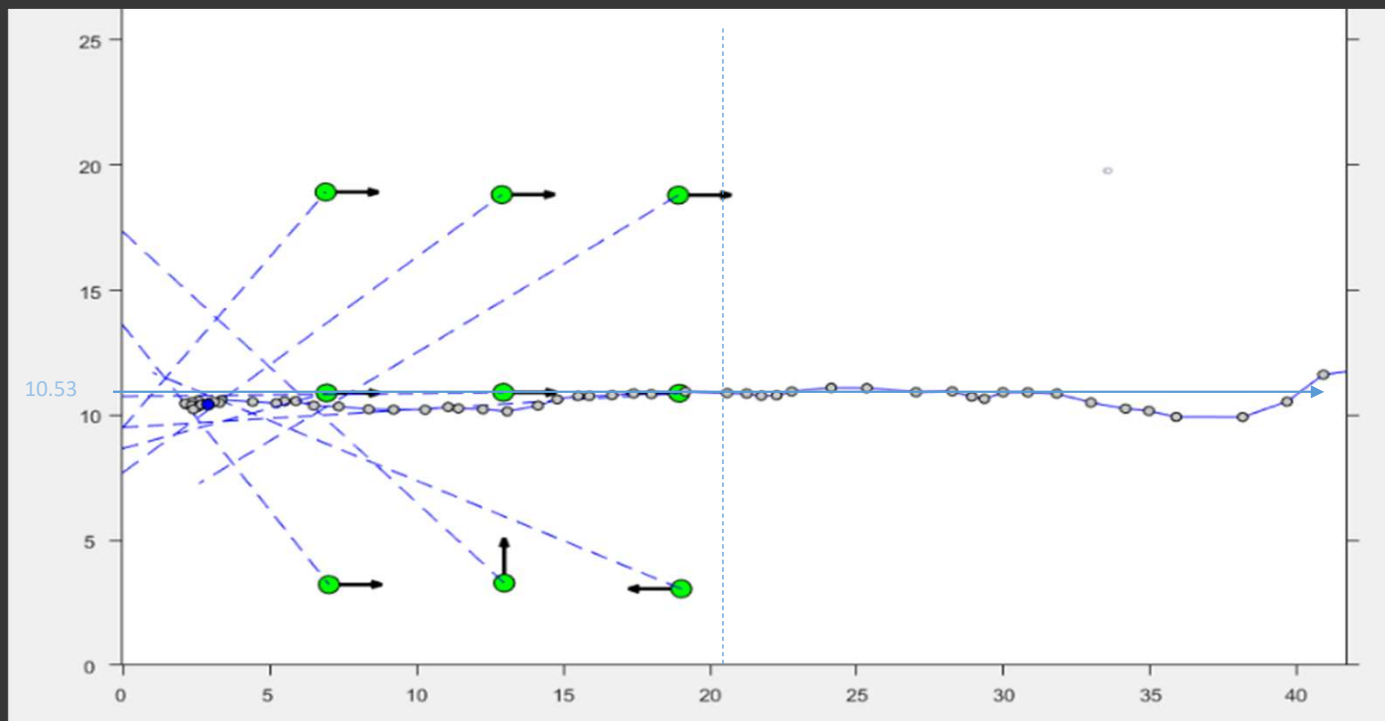
# Example of System Testing

- In test set-up nine locators with CorePatch antenna board installed in ceiling beams of a sports arena at 12m height
- x/y grid of locators 6m/8m



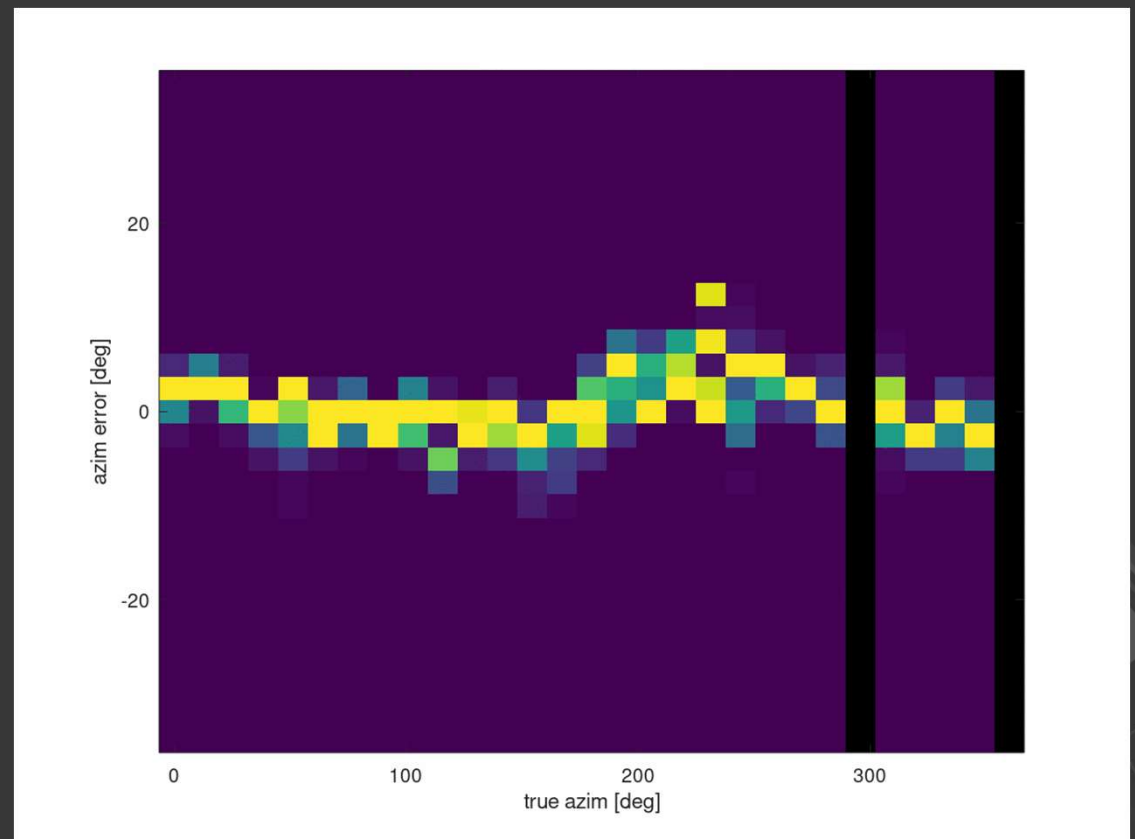
## Example of Combined Dynamic and Range Testing

- Same locator setup as on the previous slide
- Tag moved below the nine locator array and outside of it to distance of about 30m from the nearest locator



## Example of Angle Response

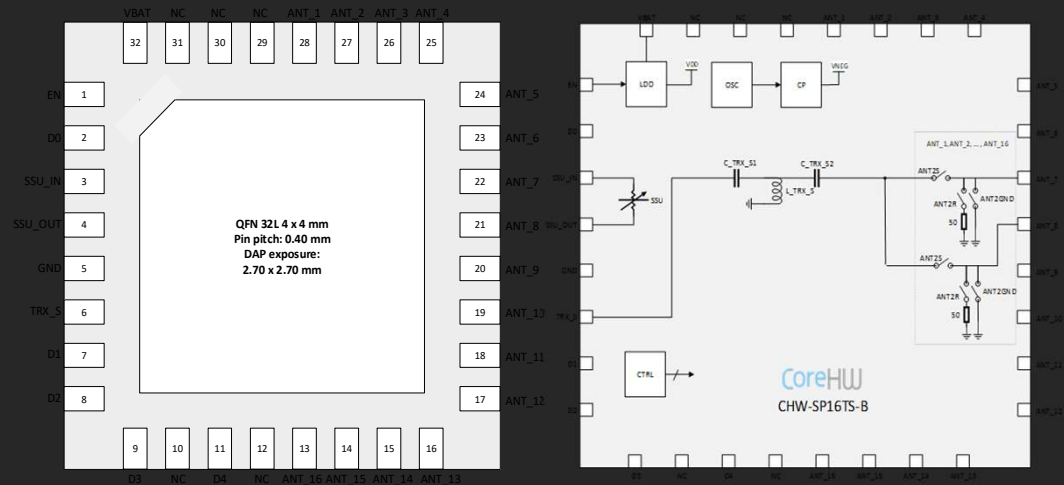
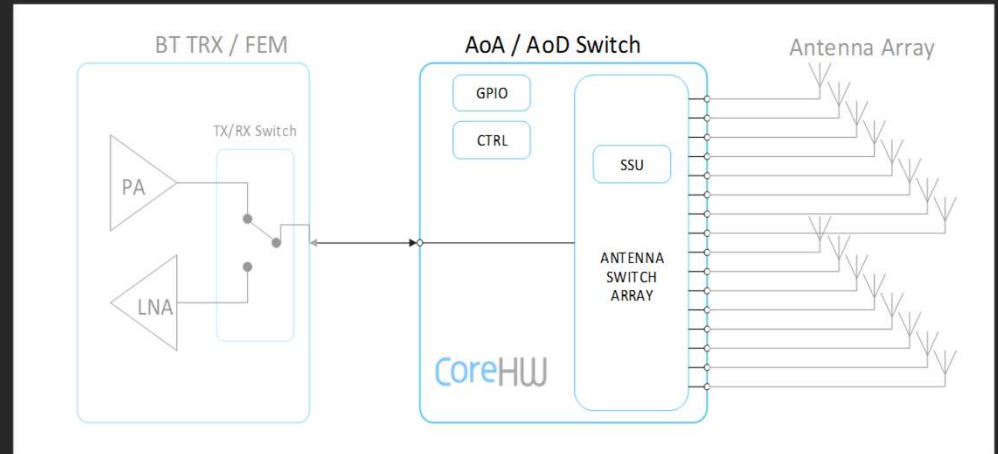
- Deviation in azimuth angle of a locator with CorePatch antenna array
- Angle response includes error from antenna board, I/Q sampling and angle algorithm



# CoreHW CHW1010 (CHW-SP16TSB) Antenna Switch

Optimized for Bluetooth 5.1 AoX  
direction finding

- SP16TS with 16 single-ended antenna ports
- SP8TD with 8 differential antenna ports
- Frequency range 2.402 – 2.480 GHz
- Start-up time < 15us, short settling time of below 500ns
- Highly accurate phase balance between antenna ports
- Patented soft switching for optimal AoD performance
- Terminated non-active antenna ports
- 6-pin GPIO control interface





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