

# Low-Power Leaky-Wave Radar With Single-Chain Doa Detection At 50–60 Ghz

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## BRIEF DESCRIPTION

A compact, low-power frequency modulated continuous wave (FMCW) radar system enabling high-resolution direction-of-arrival (DoA) detection using a single leaky-wave antenna and transceiver chain

## FULL DESCRIPTION

This technology introduces a novel radar transceiver operating in the 50–60 GHz frequency band that combines mono-static and bi-static operation for DoA detection. Unlike traditional multi-antenna multiple-input multiple-output (MIMO) FMCW radars, it uses a single leaky-wave antenna and a shared transmitter/receiver path, significantly reducing system complexity, size, power consumption, and cost. This efficient design suits embedded, battery-operated applications in automotive, healthcare, wearable devices, industrial, and robotics fields.

## SUGGESTED USES

- » Wearable sensing and gesture recognition in next-generation smartwatches and fitness devices.
- » Automotive radar systems such as parking assistance, blind-spot detection, and autonomous driving.
- » Mobile robotics platforms needing real-time obstacle detection and angular awareness.
- » Healthcare monitoring including non-contact respiratory and motion sensing.
- » Industrial inspection, conveyor monitoring, defect detection, and process automation.
- » Smart internet of things (IoT) sensors for compact and energy-efficient radar sensing.

## ADVANTAGES

- » Significantly reduced hardware complexity with a single antenna and transceiver chain.
- » Low power consumption of 262 mW compared to traditional multi-chain radar systems.
- » Compact footprint suitable for embedded and portable devices.
- » High angular (12°) and range (1.4 cm) resolution achieved via frequency-scanned leaky-wave antenna.
- » Eliminates need for inter-chain synchronization, calibration, and complex beamforming.
- » Full-duplex operation enabled by a custom high-isolation circulator.
- » Faster system integration and lower manufacturing costs.

## PATENT STATUS

Patent Pending

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## OTHER INFORMATION

## CATEGORIZED AS

- » **Communications**
- » Internet
- » Networking
- » Wireless

## RELATED CASES

2026-634-0

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