

New Product Update

Low-power, 77-GHz mmWave radar sensors level up industrial sensing

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Radar Industrial

What is mmWave radar?

mmWave radar is used to sense people and objects:

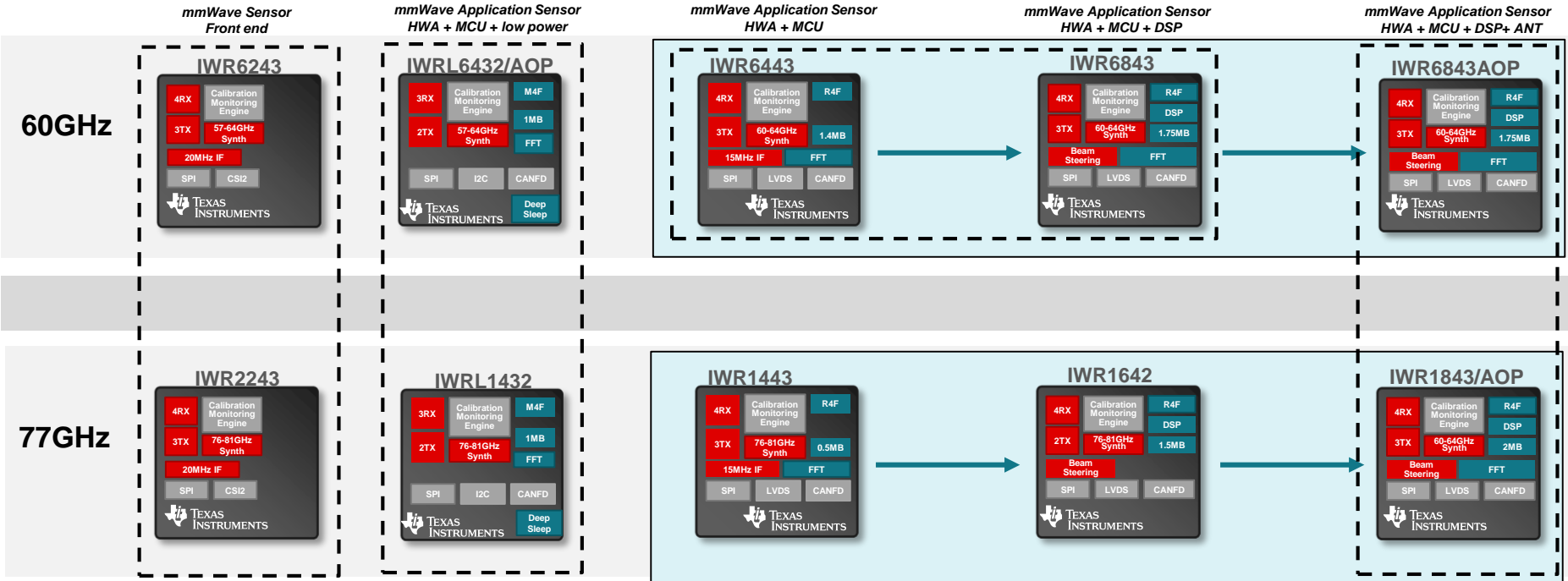
- Range
- Velocity
- Angle

Traditionally, 77-GHz radar has been used in automotive applications but has also been growing for non-automotive applications like:

- Level sensing
- Off-highway vehicles
- Parking barriers
- ebikes and other mobility solutions



Industrial radar 60GHz/77GHz | portfolio overview



- **Frequency regulation agnostic design** : Pin-to-pin compatibility with 60GHz and 77GHz sensors.
- **One Software Investment**: Common software API and framework across 60GHz/77GHz devices make software re usable and portable across devices.
- **Safety story**: SIL 2 level for Industrial safety applications

IWRL1432 | product overview

Designed for **small form factor**, **low BOM** cost and **lower power** applications

Integrated transceivers:

- 3 Rx and 2 Tx

Integrated frequency synthesizer:

- 77GHz to 81GHz

Processing:

- Arm® Cortex®-M4F MCU @ 160 MHz
- Integrated FFT, CFAR-CA HWAs

Memory:

- 1.0 MB SRAM

Interfaces:

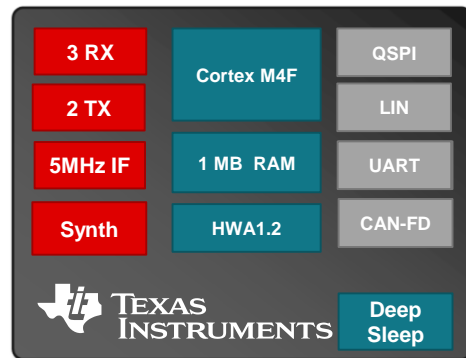
- SPI, UART, I2C, QSPI, GPIOs

System simplification:

- Multiple power modes to enable ultra-low power
- One, two or three power-rail topologies (1.8V, 1.2V, 3.3V)

Package:

- 6.45 x 6.45 mm FCCSP (0.5mm pitch) -- [Samples Now](#)



Sample/EVM: Now

Production: 2024

* Early production options available

Level sensing



- Contactless measurement of liquids, solids, and powders up to 100m
- Immune to foam, vapor, powder, dust, condensates
- Minimal influence by temperature and pressure
- Targeting 4-20mA loop powered systems
- <4mJ / measurement
- <1mm accuracy
- SIL-2 certified

Other applications

Off-highway vehicles

- Agriculture
- Construction
- Forklifts
- Etc.

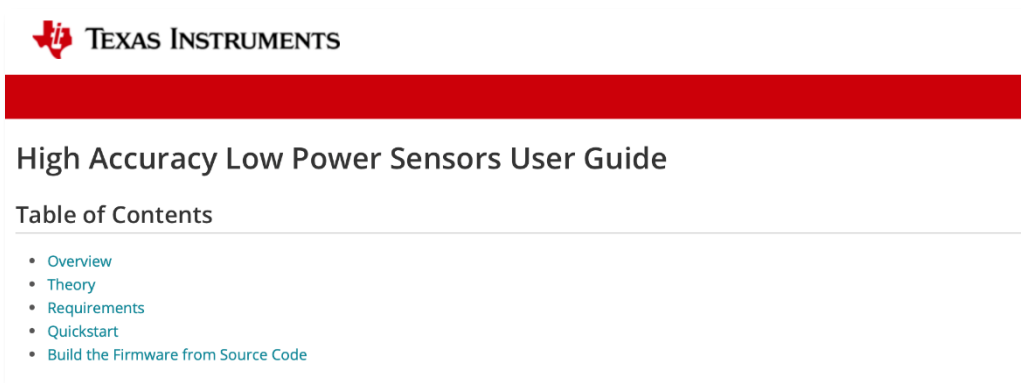
Mobility solution sensors

- ebikes
- Scooters
- Etc.

Parking barrier sensors



High accuracy low power sensor | lab



High accuracy example uses a ZoomFFT

ZoomFFTs use 2 FFTs

- 1 coarse FFT to find a peak (or multiple)
- A zoomed-in FFT, analyzing a portion of the peak at much higher resolution

This is how to achieve accuracy of <1mm

IWRL1432BOOST | evaluation module

Operates in the 76-81 GHz band

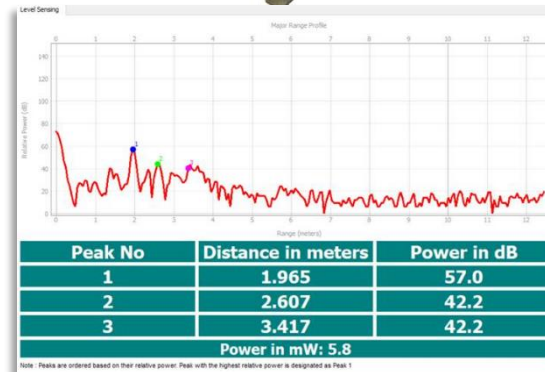
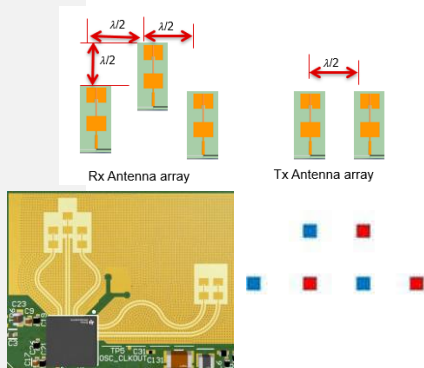
Compatible with

- DCA1000 EVM for raw ADC data capture
- MCU LaunchPad™ development kit ecosystem

Interfaces:

- LIN
- CAN
- UART
- SPI
- LVDS
- DCA1000 data capture interface
- Booster / LaunchPad connector

Angular resolution of 29° in azimuth and 58° in elevation



Development resources



Radar Academy

Learn mmWave radar fundamentals
Modules, videos, app notes

Resource Explorer

Filter by keyword

mmWave radar sensors / Training / Radar Academy (1.00.00.16) / Introduction / Fundamentals of FMCW Radar

Radar Academy

The Radar Academy is a collection of training modules for all developers to learn about TI's radar sensor offering and the underlying mmWave Radar technology. The academy explores the technical foundation of mmWave sensing and demonstrates how this can be leveraged with TI's radar sensor portfolio.

Search Radar Academy

Introduction

MODULE 1	MODULE 2	MODULE 3
Overview Introduction to TI radar sensors and ecosystem	Fundamentals of FMCW Radar Application note discussing fundamentals of FMCW Radar and relevant equations in detail	Terminology Summary of terms and acronyms related to TI radar sensors



Radar Toolbox

Demonstrate and develop radar solutions
Examples, software, labs

Resource Explorer

Filter by keyword

mmWave radar sensors / Embedded Software / Radar Toolbox (1.10.00.13) / Applications / Industrial / Level Sensing / Level Sensing Overview

Radar Toolbox for mmWave Sensors

Discover > Evaluate > Design

Featured Content

 Radar for Video Doorbells Demonstrates the use of TI mmWave sensors to detect an approaching person and wake up a video doorbell. Works with IWRL6432	 In-Cabin Radar Sensing Leverage our scalable portfolio of 60GHz radar sensors to enable robust and accurate detection, localization, and classification of occupants (adult vs child) inside a 2-3 row vehicle, all using a single sensor. Works with AWRL6432	 High End Corner Radar This demo showcases the implementation of mmWave High-end Corner Radar using AWR2944. This demo assists in the development of software applications to meet NCAAP R79 safety requirements. Works with AWR2944
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Application Overviews

Links to learn more

Content type	Title	Link to content / details
Product page	IWRL1432	Link
Evaluation module	IWRL1432BOOST EVM	Link
Development tools	Radar Toolbox	Link
Radar education modules	Radar Academy	Link

Visit www.ti.com/npu

For more information on the New Product Update series, calendar and archived recordings



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