# PRM2142X-V Perspectus mmWave Module

*Product Brief*

2026-03-27

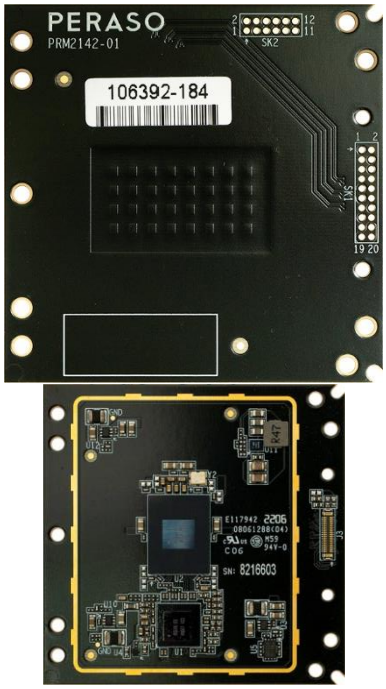
## Overview

The PRM2142X-V is a member of the ***Perspectus*** module series which provide a complete USB 3.0 to IEEE 802.11ad solution with advanced features for long range, outdoor applications. It utilizes the Peraso X720 IEEE 802.11ad 60 GHz phased array chipset which includes a baseband processor and a high-power mmWave beamforming transceiver RFIC.

The PRM2142X-V incorporates a 32-element phased array antenna. This antenna is integrated into the PCB and provides uniform performance over the entire IEEE 802.11ad/ay band from 57 to 71 GHz.

The Baseband processor is the PRS4601-B2E. This provides all MAC and PHY layer functionality necessary for IEEE 802.11ad operation and supports point-to-point or point-to-multipoint capability.

The PRS1165 RFIC provides 16 RF chains with high transmit power levels. It supports all 6 of the IEEE 802.11ad/ay defined channels.




## Target Applications

- Point-to-multipoint Fixed Wireless Access Networks
- Point-to-Point Backhaul / Fiber alternative

## Features

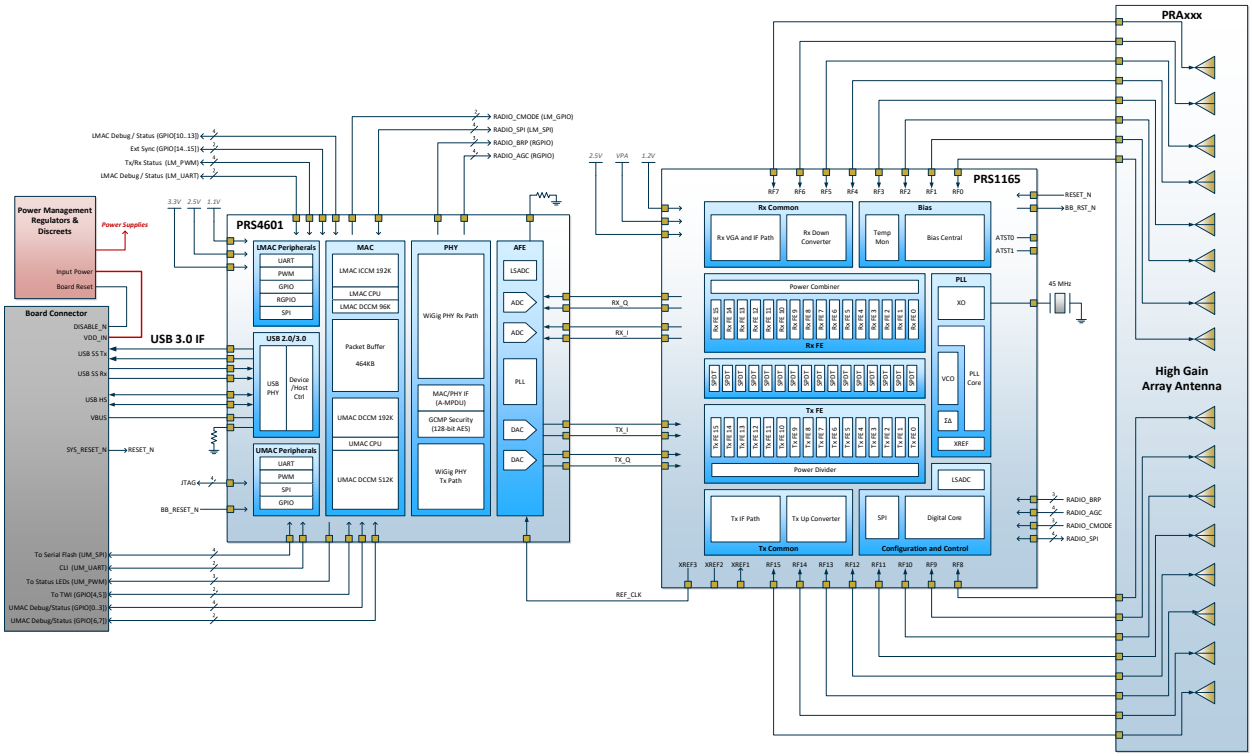
- Operates in the unlicensed 57 to 71 GHz band
- Full and ½ channel support
- 32-element integrated phased array antenna
- MCS 1 (BPSK) to MCS 12 (16QAM) support
- Fully integrated MAC, PHY, radio, and antenna
- IEEE 802.11ad MAC and PHY compliance
- 46 dBm EIRP*
- Total system DC power
  - Tx: 11.75 W (QPSK)
  - Rx: 4.5 W (QPSK)
- Automatic rate adaptation
- Dynamic beamforming
- AES 128-bit data encryption
- Automatic calibrations
- WPA2 and WPA3 Authentication
- ATPC- Automatic Transmit Power Control
- 1PPS synchronization support**
- Multi-user support up to 48 STA
- A-MSDU, A-MPDU data aggregation
- Peraso Directional Beam Scan and Connect (DBSC)
- STA focus
- USB 3.0 data and control interface
- Integrated power management
- -92 dBm receive sensitivity @MCS1***
- Up to 3.5 Gbps bidirectional TCP/UDP throughput
- -40°C to 85°C operation
- Single 5V power supply input
- Compact 50mm x 50mm form factor

* Can be configured to a lower EIRP to meet regulatory restrictions

** Optional firmware enabled feature. Contact Peraso sales support for more information.

*** Incident at the module antenna

# Block Diagram




# General Description

The PRM2142X-V high performance, 60GHz transceiver module provides full IEEE 802.11ad functionality from a USB data and control interface to an over-the-air antenna. The module has a compact 50mm x 50mm form factor.

The baseband connector provides the interface for USB3.0 data and additional control signals. The module is powered from a single 5-volt supply on the same connector.

The PRM2142X-V uses the PRS4601-B2E baseband processor, and the PRS1165 RFIC.

The PRS4601 IEEE 802.11ad Baseband incorporates the Analog Front End, BB PHY/ MAC, and two RISC CPU cores. It utilizes a highly flexible, dual CPU soft MAC integrates all IEEE 802.11ad MAC functions. This includes A-MSDU, A-MPDU, WPA2, and WPA3 security.

This module operates in the unlicensed 57 to 71 GHz band.

The PRM2142X-V utilizes a phased array antenna. The PRM2142X-V antenna is capable of beamforming to optimize the wireless connection. The antenna is capable of steering the beam +/-20 degrees in elevation and +/-45 degrees azimuth.

The PRM2142X-V is fully tested to an over-the-air antenna input/output specification, thus relieving OEMs from the complexities of ensuring the integrity of the mmWave RF performance.

# Key Specifications

| Parameter | Value | | |
|---|---|---|---|
| Data Interface | USB3.0 | | |
| Air Protocol | IEEE 802.11ad | | |
| Modulation Schemes | MCS 1 (BPSK) to MCS 12 (16QAM) | | |
| Multiple Access Modes | CBAP, proprietary Long Range CBAP and Controlled Access protocols | | |
| Security Modes | 128-bit AES WPA2 WPA3 | | |
| Networking Support | Infrastructure, peer-to-peer, standard WLAN, point-to-multipoint | | |
| | **Conditions** | **Value (Typ.)** | **Units** |
| RF Frequency | | 57 to 71 | GHz |
| Channel bandwidth | IEEE 802.11ad Channels 1-6 | 2.16 | GHz |
| Module size | Length x Width | 50 x 50 | mm |
| Operating Temperature Range | | -40 to 85 | ˚C |
| **TX Parameters** | | | |
| EIRP | $T_{amb}$=25˚C @MCS1 | 46 | dBm |
| **RX Parameters** | | | |
| Sensitivity | $T_{amb}$=25˚C, @MCS1 | -92 | dBm |
| **Beam Forming Parameters** | | | |
| Azimuth Scan Range | -3dB edge, Channel 4 | +/-45 | deg |
| Elevation Scan Range | -3dB edge, Channel 4 | +/-25 | deg |
| **DC Power Consumption** | | | |
| TX DC Power | 16 RF chains. 100% duty cycle. | 11.75 | W |
| RX DC power | | 4.5 | W |



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