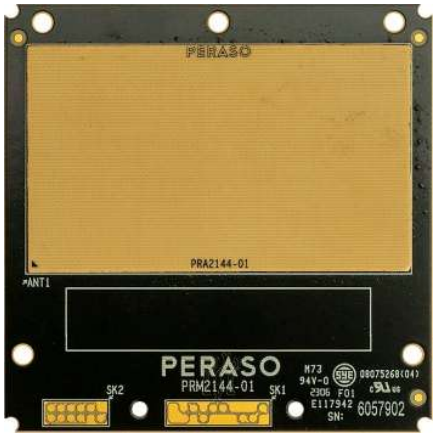
Overview

The PRM2144X-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 PRM2144X-V incorporates a 128-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

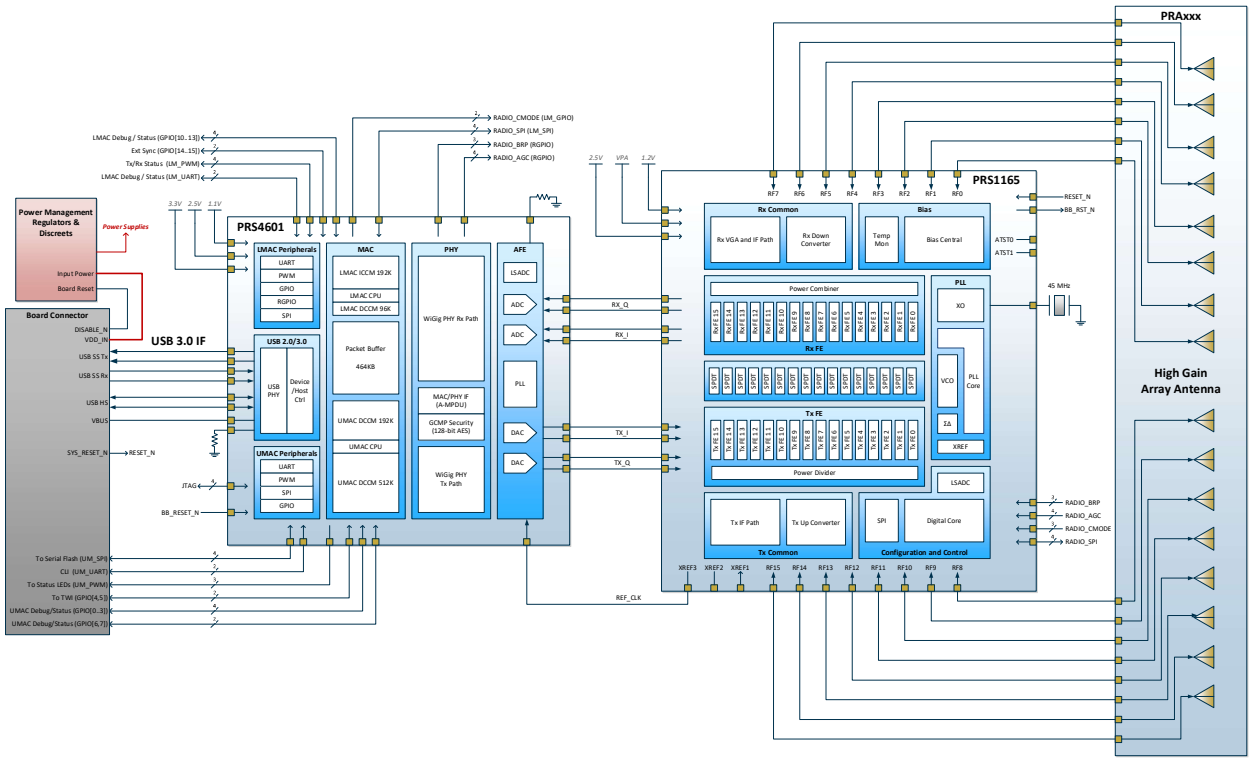
- Point-to-multipoint Fixed Wireless Access Networks
- High performance 60 GHz access points and clients
- mmWave point-to-point backhaul links

Features

- Operates in the unlicensed 57 to 71 GHz band
- Full and ½ channel support
- 128-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
- 50 dBm EIRP*
- Total system DC power:
- Tx: 11.75W (at QPSK)
- Rx: 4.5W (at 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
- -95 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 55mm x 55mm form factor

* Can be configured to a lower EIRP to meet regulatory restrictions
** Optional firmware enabled feature
*** Incident at the module antenna

Block Diagram



General Description

The PRM2144X-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 55mm x 55mm 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 PRM2144X-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 PRM2144X-V utilizes a phased array antenna. The PRM2144X-V antenna is capable of beamforming to optimize the wireless connection. In the stand-alone application, the antenna is capable of steering the beam +/-10 degrees (azimuth); +/-20 degrees (elevation).

Peraso module products are 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 0 (BPSK) to MCS 12 (16QAM)		
Multiple Access Modes	CBAP, proprietary Long Range CBAP and Controlled Access protocols		
Security Modes	128-bit AES WPA2 and WPA3		
Networking Support	Point-to-Point; 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	55 x 55	mm
Operating Temperature Range		-40 to 85	˚C
TX Parameters			
EIRP	T_{amb}=25˚C, @MCS1	50	dBm
RX Parameters			
Sensitivity	T_{amb}=25˚C, @MCS1	-95	dBm
Beam Forming Parameters			
Azimuth Scan Range	-3dB edge, Channel 4	+/-10	deg
Elevation Scan Range	-3dB edge, Channel 4	+/-20	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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