PRM2143X mmWave Module
PRODUCT BRIEF

OVERVIEW

The PRM2143X is a complete USB 3.0 to 802.11ad module with advanced features for long range, outdoor applications. It utilizes the Peraso X720 802.11ad 60 GHz phased array chipset which includes a baseband processor and a high-power mmWave beamforming transceiver RFIC.

The PRM2143X incorporates a 64-element phased array antenna. This antenna is integrated into the PCB and provides uniform performance over the entire 802.11ad band from 57 to 71 GHz.

The Baseband processor is the PRS4601-B2E. This provides all MAC and PHY layer functionality necessary for 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 802.11ad defined channels.
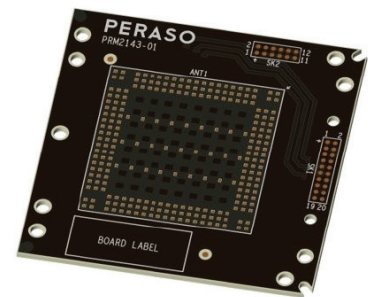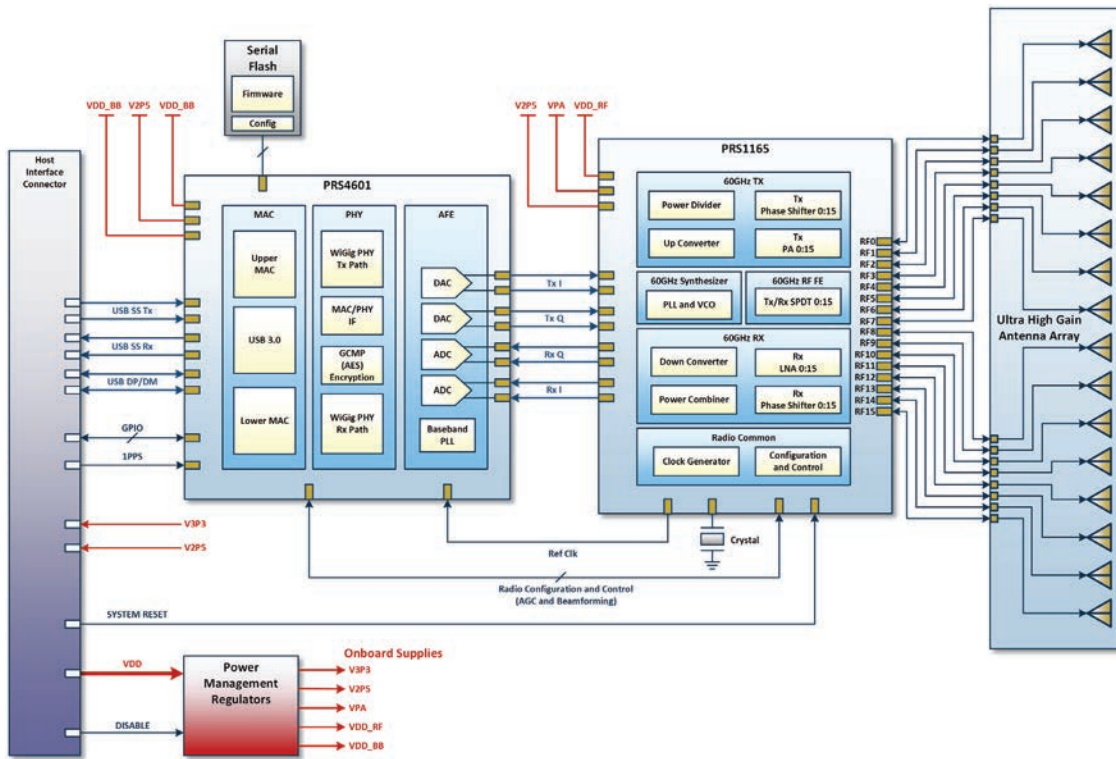

Figure 1: PRM2143X

FEATURES

- Operates in the unlicensed 57 to 71 GHz band
- 2.16 GHz and 1.08 GHz channel bandwidth
- pi/2-BPSK, pi/2-QPSK modulation support
- Fully integrated MAC, PHY, radio, and antenna
- 802.11ad MAC and PHY compliance
- Automatic rate adaptation
- Dynamic beamforming
- Automatic calibrations
- AES 128 bit data encryption
- 1PPS synchronization support
- WPA3 Authentication
- A- MSDU, A-MPDU data aggregation
- Peraso Directional Beam Scan and Connect (DBSC) for establishing long-range PtP links

- USB 3.0 data and control interface
- Integrated power management
- 16-element integrated phased array antenna
- -91dBm receive sensitivity @MCS4
- 2Gbps maximum data rate
- 45 dBm EIRP
- Total system DC power:
  - Tx: 13W (at QPSK, 16 elements active)
  - Rx: 5W (at QPSK, 16 elements active)
- -40°C to 85°C operation
- Single 5V power supply input
- Compact 50mm x 50mm form factor

BLOCK DIAGRAM

KEY SPECIFICATIONS

Parameter	Value
Data Interface	USB3.0
Air Protocol	802.11ad
Modulation Schemes	MCS0-9 (pi/2-BPSK, pi/2-QPSK)
Multiple Access Modes	CBAP, proprietary Long Range CBAP and Controlled Access protocols
Security Modes	128-bit AES WPA3
Networking Support	infrastructure , peer-to-peer, standard WLAN, point-to-multipoint

	Conditions	Value (Typ.)	Units
RF Frequency		57 to 71	GHz
Channel bandwidth	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	Tamb=25˚C, Channel 4, MCS9	45	dBm
RX Parameters			
Sensitivity	Tamb=25˚C, Channel 4, MCS4	-91	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.	13	W
RX DC power		5	W