

PRM2144X mmWave Antenna Module

PRODUCT BRIEF

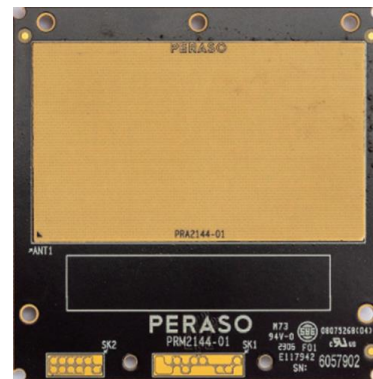
OVERVIEW

The PRM2144X is a complete wireless adapter module supporting the IEEE 802.11ad standard 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 module utilizes a USB 3.0 interface for data and control.

The PRM2144X incorporates a 128-element phased array antenna. This antenna is integrated into the PCB and provides uniform performance over the entire IEEE 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 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 defined channels.



TARGET APPLICATIONS

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

FEATURES

High Performance

Fully symmetric throughput up to 3 Gbps (combined) and fully symmetric operation using 2 GHz wide channels and 16-QAM modulation (up to MCS 12)¹.

Long Range

Operating in the unlicensed 57 to 71 GHz band with support for channels 5 and 6 allows support for links over 2 km range at 1 Gbps data rate².

Multipoint Networks with 32 Clients

The PRS4601 baseband provides support for up to 32 clients devices (stations) in a single network; with 1PPS synchronization and extensions to enable bridging over multiple wireless links, networks can easily be scaled to 100's of 1000's of devices.

Dynamic Beamforming and Rate Adaptation

The integrated 128-element (16 RF-chain) high directivity phased array antenna supports scanning in both elevation and azimuth; the firmware continuously monitors the link and adapts the beam and MCS to ensure optimal performance.

Highly Secure

Supporting the latest WPA3 security, 128-bit AES encryption and protected management frames, the wireless network ensures data is protected.

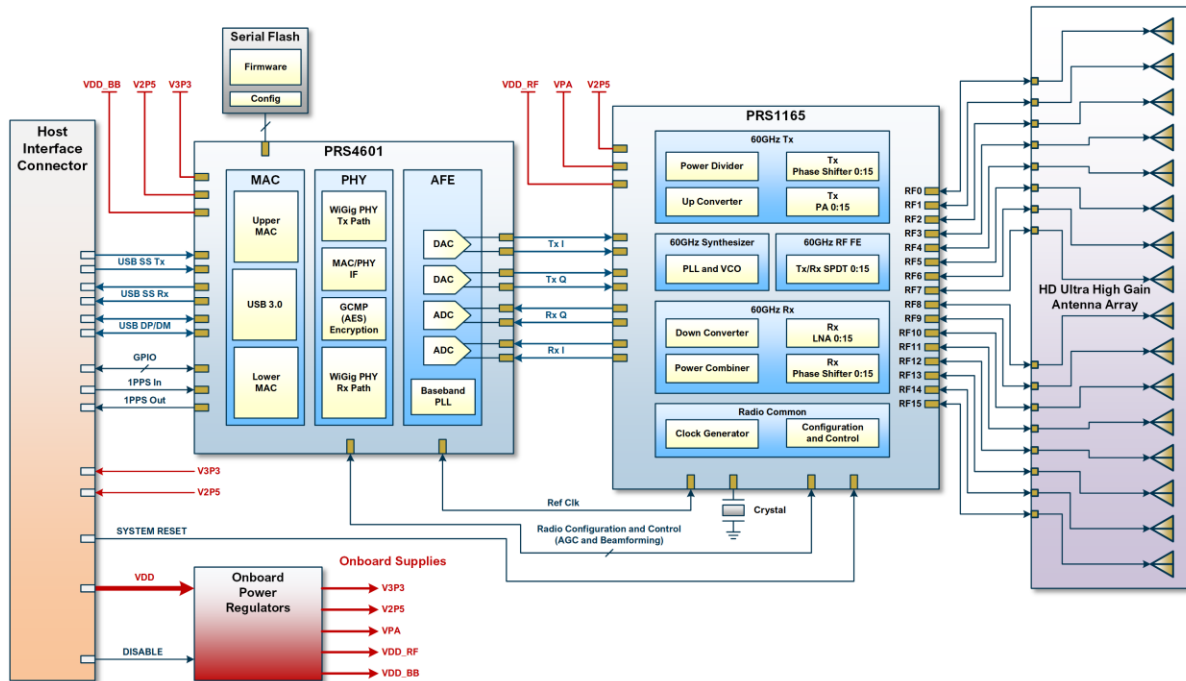
Easy Integration

The USB 3.2 Gen 1 interface (5 Gbps) and Linux WLAN host drivers simplify system integration; compact 55mm × 55mm form factor.

¹ 16-QAM operation is limited under some operating conditions

² Channels 5 and 6

BLOCK DIAGRAM



KEY SPECIFICATIONS

Parameter	Value		
Data interface	USB 3.2 Gen 1 (SuperSpeed USB 3.0)		
Air protocol	IEEE 802.11ad		
Modulation schemes	pi/2-BPSK, pi/2-QPSK, and 16-QAM modulation support (MCS0 to MCS12)		
Channel access modes	CBAP, proprietary long range CBAP and controlled access protocols		
Security	128-bit AES WPA3		
Networking topology	Long-range Point-to-Multipoint, Point-to-Point, Standard 802.11 WLAN		
Operating temperature range	-40 to 85 °C		
	Conditions	Value (Typical)	Units
RF frequency		57 to 71	GHz
Channel bandwidth	IEEE 802.11ad Channels 1-6	2.16 or 1.08	GHz
TX Parameters			
EIRP	T _{amb} = 25°C, Channel 5, MCS 9	46	dBm
Total Radiated Power	T _{amb} = 25°C, Channel 5, MCS 9	22	dBm
RX Parameters			
Sensitivity	T _{amb} = 25°C, Channel 5, MCS 4	-70	dBm
Antenna Parameters			
Boresight gain	Channel 5	25	dBi
Azimuth -3dB beam width	Channel 5, boresight beam	6	degrees
Elevation -3dB beam width	Channel 5, boresight beam	11	degrees
Maximum Side Lobe (boresight beam, Az.)	Channel 5, boresight beam, tapering enabled	-19	dB
Maximum Side Lobe (boresight beam, El.)	Channel 5, boresight beam, tapering enabled	-13.5	dB
Azimuth scan range	Channel 5, -3dB edge, elevation 0 deg.	+/-10	degrees
Elevation scan range	Channel 5, -3dB edge, azimuth 0 deg.	+/-20	degrees
DC Power Consumption			
TX DC Power	16 RF chains active, 100% duty cycle	11.8	W
RX DC Power	16 RF chains active, 100% duty cycle	4.5	W
Idle Power	RF link down	1.1	W

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