PUP_EN24C_T2R4

PUP_EN24C_T2R4 (Figure 1) is a MIMO radar development platform. It works at K-band with two transmitting and four receiving channels.

If PUP_ATN24P_T2R4 patch antenna (Figure 2) is selected, the platform can be configured as MIMO radar. The best working frequency for this antenna is 24GHz-24.5GHz with 8dB gain. Two transmitter antennas and four receiver antennas are configured as MIMO array (Figure 3). Eight signals can be virtually extracted from the receivers using the orthogonality of the transmitted signals, thereby obtaining a finer spatial resolution compared to its array counterpart.

Figure 1. PUP_EN24C_T2R4

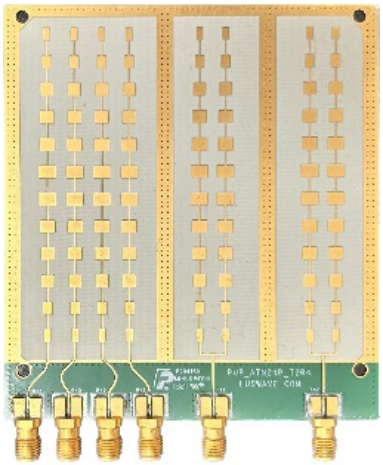

Figure 2. PUP_ATN24P_T2R4

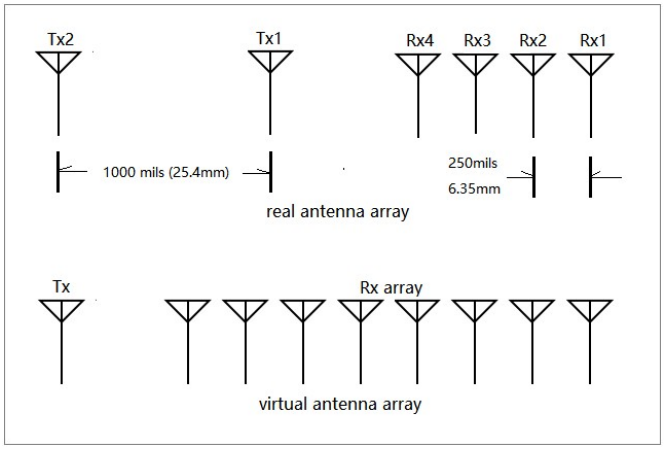

Figure 3. Virtual antenna array

If six PUP_ATN24C_HN_8 horn antennas (Figure 4) or six PUP_ATN24C_HN_10/_15 antennas (Figure 5) are selected, longer RF cables can be used, and the platform can be configured as bi-static radar or interferometric radar. Users can use their own antennas and RF cables.

The RF front-end frequency sweep is implemented with a phase-locked loop (PLL) to achieve linearity of frequency modulations. The FPGA-based controller connects the front end with an eight-channel LVDS (low-voltage differential signaling) 50Msps pipeline ADC module and connects the user's computer with a high-speed (up to 480Mb/s) USB interface.

Figure 4. PUP_ATN24C_HN_8

Figure 5. PUP_ATN24C_HN_10/_15

This device requires a licensed installation of MATLAB, which must be provided by the user. The platform includes user-friendly MATLAB GUI (Graphical User Interface) source code. The GUI serves not only as an operating interface but also as a reference implementation demonstrating the system workflow, data formats, and signal processing methods. The provided source code can be readily adapted and integrated into your own projects, helping to accelerate development.

The platform works between 24GHz and 25GHz and is expandable to 24GHz-26GHz. The detectable range is approximately 15-20 meters for people and 40-60 meters for medium-sized vehicles.

Raw data can be recorded for post-processing.

SPECIFICATIONS

Specification	Minimum	Typical	Maximum
Channels		2x Transmitters, 4x Receivers	
Antennas		6x External Antennas	
Modulations		FMCW, CW	
Typical Frequency Range	24GHz		25GHz
Expandable Frequency Range	24GHz		26GHz
Sweep Time		0.5ms, 1ms, 2ms, 4ms, 8ms	
Sample Per Sweep		128,256,512,1024,2048,4096	
Tuning Voltage	0		4V
Tuning Sensitivity		0.8GHz/v	
Transmitting Power (24-25GHz)	19dBm	20dBm	21dBm
SSB Phase Noise @1MHz offset		-99dBc	
Noise Figure		10dB	
Maximum Input power		5dBm	
IIP_1dB		-12dBm	
Supply Voltage	5.75V	6V	6.25V
Supply Current		1200mA	
Operation Temperature	-40 ºC		85 ºC
Dimensions		L: 130mm, W: 102mm, H: 15mm	
Weight		10oz	