

# W band FMCW Radar

## W-FMCWR-9296 Previously named TU-WTR-FP150

### Fully Integrated Stand-alone FMCW Radar

#### Overview

The W-FMCWR-9296 radar module is a fully integrated stand-alone millimeter-wave FMCW radar designed for radar sensors and security systems. A digital input is provided for control of the FMCW sweep characteristics/baseband receive gain and the only output is a baseband beat frequency signal, the frequency of which is proportional to the range. The standard RF transmit power is 40mW with an option for 10mW. Operating at a centre frequency of 94GHz with a 4GHz bandwidth, this module has substantial advantages over ~76GHz systems, taking advantage of the low atmospheric attenuation 'window'. It is especially suited to low visibility navigation such as helicopter brownouts and marine fog environments.

The module contains Arralis monolithic millimeter-wave P-HEMT integrated circuits with separate power/microwave-baseband boards that enable integrated FMCW chirp generation and baseband amplification/filtering. Advantages include full control of FMCW chirp generation characteristics and baseband amplification, WR10 TX/RX antenna connections and integration simplicity.

#### Features

- Integrated self contained module.
- 92-96GHz frequency range.
- High output power.
- FMCW operation.
- Built-in FMCW sweep generation.

#### Applications

- Excellent performance in rain, humidity, fog and dusty conditions.
- Collision avoidance radar used in poor weather conditions.
- Muzzle velocity testing.
- Missile guidance system.
- Commonly used on UAVs, aircraft, marine ships and rotor-craft.

## FMCW System Options:

### W-FMCWR-FB-9296 - Fixed Beam System

The fixed-beam system target parameters are: target return strength, target range, target velocity

### W-FMCWR-1D-9296 - 1D-Monopulse System

The 1D-monopulse system target parameters are: target return strength, target range, target velocity, target angle (azimuth OR elevation).

### W-FMCWR-2D-9296 - 2D-Monopulse System

The 2D-monopulse system target parameters are: target return strength, target range, target velocity, target azimuth angle, target elevation angle.

## W band FMCW Radar Housing Design



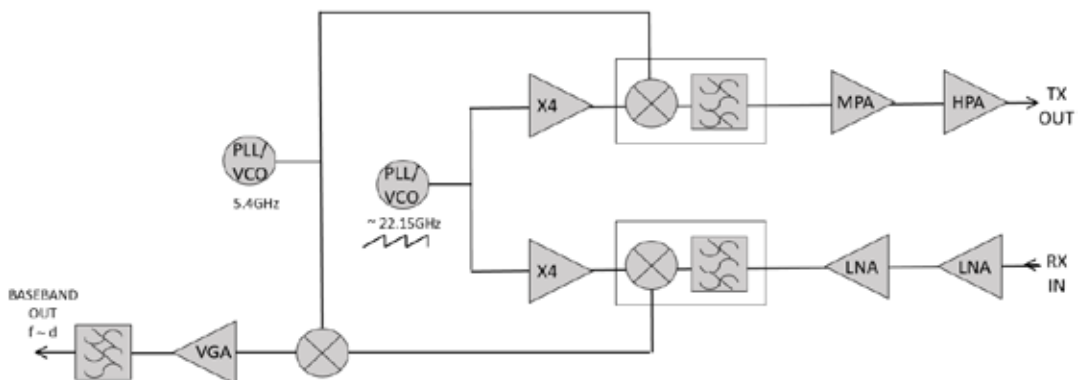
## Specification Overview

Parameter	Min.	Typ.	Max.	Units	Comment
TX Frequency	92		96	GHz	
LO Frequency	21.65		22.65	GHz	Internal Sweep Generation Digitally Controllable
IF Input Frequency		5.4		GHz	Internally Generated
Sweep Time		1		ms	Digitally Controllable
TX Output Power		16		dBm	
RX Noise Figure			6	dB	
DC Input Range			9-36	V	
Power Consumption			32	W	Fixed Beam
TX/RX Connectors				WR10 Waveguide with UG387/U flange	External Connector

### Options

- 01 Reduced Transmitted Power (10dBm)
- 02 Integrated Horn Antennas (25 dBi gain, 9° horizontal/vertical beamwidth)

## Simplified Schematic Diagram



### Preliminary Performance Data (Base Unit Design)

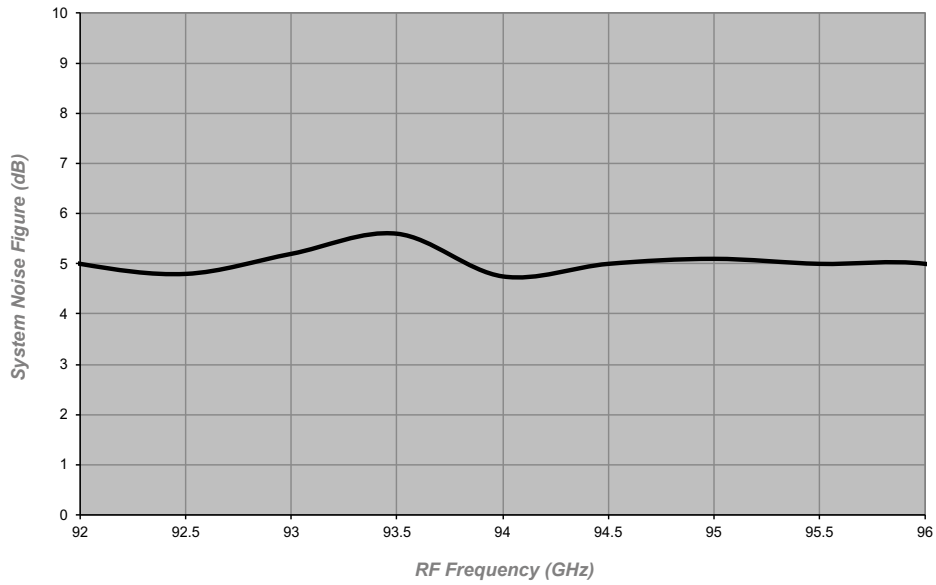


Figure 1  
System Noise Figure

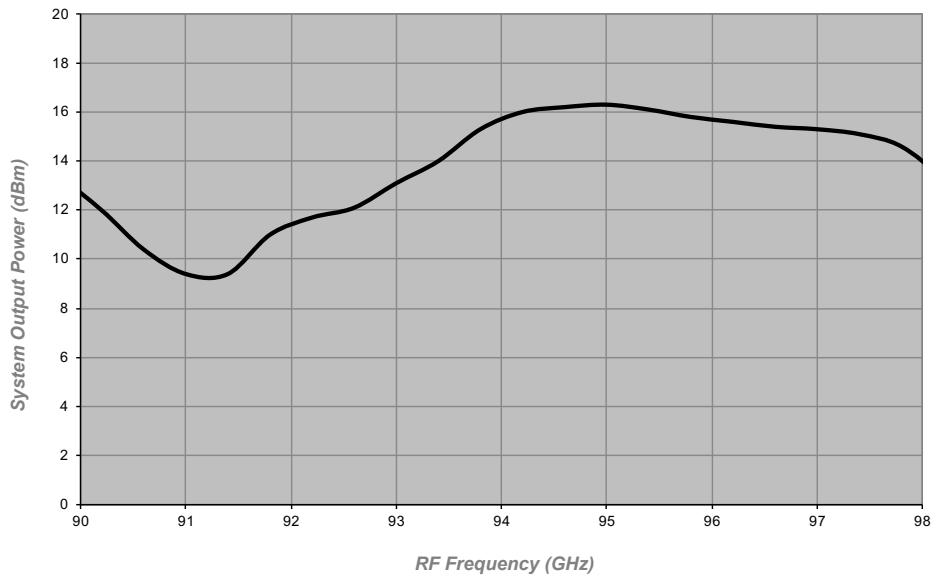
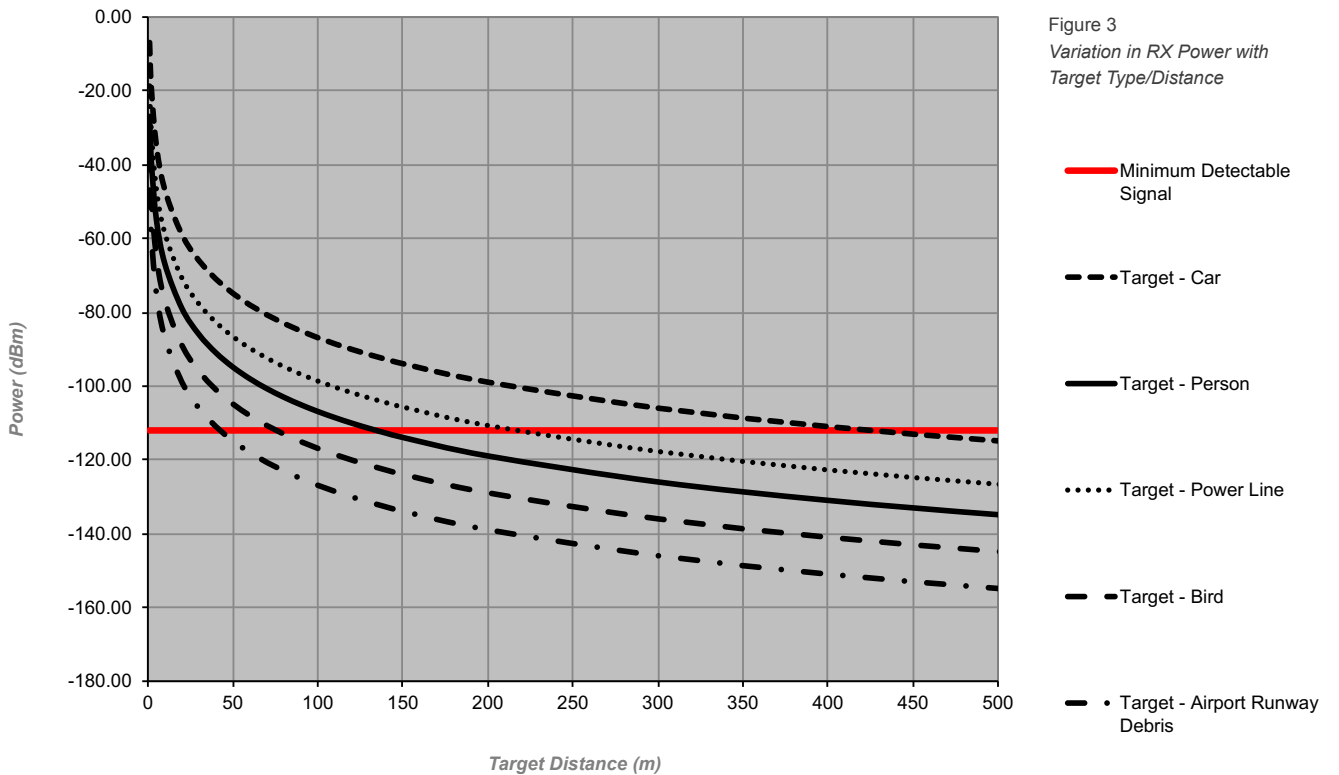


Figure 2  
System Output Power

### Preliminary Performance Data (Base Unit Design)



\* Assumes that: (i) integrated horn antennas (with 25 dBi gain) are used, (ii) SNR of 12.5 dB is required for adequate target detection.

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