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**
TU-WTR-FP150 RADAR MODULE

Specification Overview

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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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