mmW & Sub-THz

RADIOMETER FRONT ENDS

ERAVANT
FORMERLY SAGE MILLIMETER

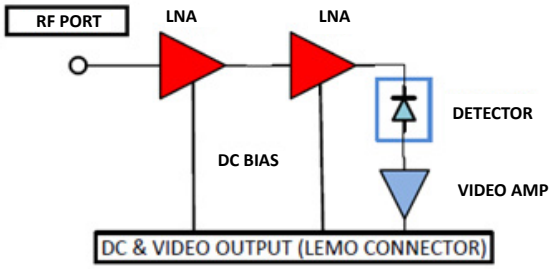
Standard full waveguide bandwidth W-Band and D-Band full power radiometric receivers are offered under the model numbers SSR-9333534040-10-M4 and SSR-1446034540-06-M4 . They are direct detection based radiometric receivers that can be used to measure the average power of the noise coming from a physical object in frequency ranges of 75 to 110 GHz and 110 to 170 GHz. By averaging a large number of independent samples, these radiometric receivers can determine the average noise power with a fraction of a degree K. The receiver LNAs have a typical gain of 40 dB with a typical noise figure of 4.0 dB. The receivers include a high sensitivity Schottky diode detector combined with a 23 dB typical gain video amplifier. The receivers are designed and manufactured for passive image cameras and remote passive sensing applications. The RF port of the receivers is equipped with a WR-10 waveguide for the W-Band model and a WR-06 waveguide for the D-Band model. Both include UG-387/U-M anti-cocking flanges. The DC bias and the video output are combined via a LEMO connector for high EM isolation. With a large selection of Eravant standard and custom antennas, many radiometric receivers can be formed and readily available for various radiometric system applications.

FEATURES

- Low Noise Figure
- High Sensitivity
- Fully Integrated Module
- Compact Size

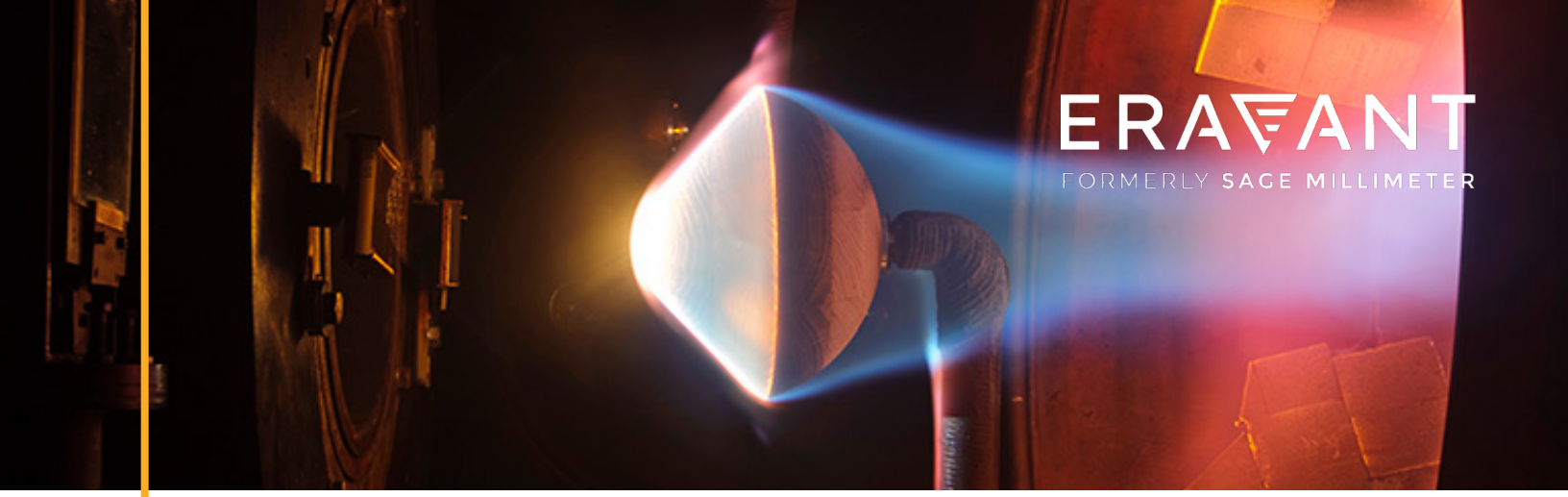
APPLICATIONS

- Passive Image Camera Systems
- Concealed Object Detection Systems
- Aircraft Landing Systems



Parameter	Minimum	Typical	Maximum
RF Frequency	110 GHz		170 GHz
Noise Figure		4.5 dB	
LNA Gain		40 dB	
Integrated Video Amplifier	Yes		
Video Amplifier Gain		23 dB	
Sensitivity1		0.4 K	
Video Output2	2,400 mV		2,800 mV
Bias Voltage		+5 VDC	
Bias Current		70 mA	100 mA
Specification Temperature		+ 25 °C	
Operating Temperature	-20 °C		+ 50 °C

Item	Specification
RF Port	WR-06 Waveguide with UG387/U-M Anti-Cocking Flange
Video Output Port	LEMO EEG.00.306.CLL Connector
Bias Port	LEMO EEG.00.306.CLL Connector
Housing	Brass
Finishing	Gold Plated
Weight	10.6 Oz
Size	3.58” (W) X 0.79” (L) X 0.49” (H)
Outline	SR-SD-MKR1-A



RADIOMETRIC RECEIVER APPLICATIONS

Passive Imaging

Radiometric receivers are widely used in passive imaging systems. A common configuration employs a 32 x 32 array of receivers. A reflector or a lens focuses an object's thermally radiated power onto the radiometric receiver array. Camera images are formed by mechanically scanning the imaging system across the field of view while the receiver output signals are recorded. Common applications include the detection of hidden contraband and weapons. Passive imaging applications also include meteorological science, radio astronomy, aircraft landing systems, navigation, search and rescue, medical diagnostics and imaging, material inspection, plasma diagnostics, and machine control systems.

Temperature Measurements

For objects at temperatures below 1000 K, thermally radiated power at millimeter-wave and sub-THz frequencies is given by $2\epsilon kTf^2$ where ϵ is the object's emissivity (ranging from 0 to 1), k is Boltzmann's constant, T is the temperature in degrees Kelvin, and f is the frequency. It is therefore possible to measure the temperature of objects and materials based on their radiated emissions. Temperature differences of a few tenths of a degree are readily measured, enabling control systems to precisely monitor temperatures in manufacturing operations where other measurement methods are unreliable or impractical.

Moisture Content Measurements

For many materials, their emissivity is highly dependent on their moisture content. As a result, radiometric receivers are often used to monitor drying processes for a variety of industrial and agricultural products. Additionally, radiometric receivers can be used to monitor concrete surfaces, as well as various other surfaces and finishes, to ensure that sufficient moisture content was maintained during the curing process or to indicate when the curing process has finished.