

A. **Description of Program and Equipment**

The program involves the development of 23 GHz radios for the transmission of data signals as well as analog information. The radio design contains several new concepts to Southwest Microwave and as such, requires a system level integrated test to confirm the theory and development in the laboratory.

The equipment can be configured either as a simplex or duplex 23 GHz microwave radio link and, although configured with an integral two foot antenna, other configurations may include four foot and six foot antennas offered by other F.C.C. approved manufacturers (Mark, Andrew, etc.). The main portion of the radio is contained in an outdoor housing which contains all the circuitry for signal processing and interfacing to customer premises. The entire unit mounts to a 3.5 inch pole or similar structure.

A T1 data version consists of a modem interface for data signals with lightning and surge suppression, a transmitter Gunn which is comprised of a cavity stabilized Gunn oscillator that is FM modulated by the modem data signal, a receive local oscillator (also a cavity stabilized Gunn oscillator) that is mixed with the receive signal to produce an intermediate frequency signal, and necessary IF processing circuitry that presents the recovered signal to the modem for customer interface. The analog version is primarily intended for the transmission of video information with appropriate subcarriers.

B. **Specific Objectives and Accomplishments**

The primary goal is to test and verify that the equipment meets necessary performance goals and specifications. This process includes the verification of new radio techniques for production purposes as well as the data logging of performance for development records.

Other objectives include the demonstration of equipment for technical purposes as well as the demonstration of equipment to prospective purchasers engaged in the business of selling or using radio equipment.

C. **Contribution to Radio Art**

This program of radio development promises to provide lower cost data radio communication utilizing improved design and manufacturing techniques.

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**Description of Program, Objectives, and Contribution  
Security Product Group**

**A. Description of Program and Equipment**

The program involves the development and product improvement of microwave security product sensors operating under Part 15 of the F.C.C. Rules and Regulations. These products include a variety of sensors operating at 10.525 and 24.125 GHz respectively. All of the sensors are low power emitters having a maximum transmit power of 15 dBm, and have antenna gains varying from 0 to 30 dB. The sensors include bistatic units employing separate transmitters and receivers, and monostatic systems utilizing a common housing for both the transmitter and receiver. The bistatic systems employ square wave amplitude modulation. The monostatic sensors utilize pulse modulation with a maximum of 4 MHz frequency deviation.

In order to stay competitive in the industry, Southwest Microwave must continually update its product line by incorporating state of the art features requiring continual testing and experimentation. In addition, it is often required to demonstrate system capabilities to potential customers. Present manufacturing at this facility requires the continual alignment of transmitters and receivers and, at any one time as many as 50 sensors may be submitted to operational burn-in.

**B. Specific Objectives and Accomplishments**

The primary goal is to test and verify that the equipment meets necessary performance goals and specifications. This process includes the verification of new systems for conformance to the F.C.C. guidelines and to improve the overall quality of the product. Other objectives include the continuous monitoring of new and existing products on an environmental test area located adjacent to the facility.

**C. Contribution to Radio Art**

This purpose of continuing product experimentation is to improve the state of the art in microwave security systems by incorporating new and improved methods of manufacturing and innovative engineering approaches in this field. The company has received several patents associated with this field.



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