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# VHF Transceiver Testing

## Application Note 1270-2



### Applications

Mobile Transceivers  
Base Transceivers  
Handheld Transceivers

### Departments

Product Test

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### Description

A major manufacturer of handheld VHF radios required a comprehensive test system which would verify correct operation of all product specifications within regulatory agency limits, over a wide frequency range and at extreme environmental conditions. Their test engineering department took on the task to design and configure a suitable test system by using commercially available test instruments and designing and fabricating, in house, the necessary custom components and fixtures.

### Problem

After a lengthy period, a system was assembled with some HP and other manufacturers' instruments complemented by in house produced fixtures.

System control was through purpose specific written software run on a PC. The problem the radio manufacturer ran into was a combination of interoperability discrepancies of the instruments of the various manufacturers, an extensive software debugging process, and in general a less than satisfactory "taking-on-line" of the system in manufacturing.

Since the test system would have to be replicated many times, each one presenting similar, yet "personal" defects to be corrected prior to certification for production testing, it was decided to investigate the contribution a test system configurator could make to improve the process.

## **Solution**

Hewlett Packard's Custom Systems Integration Team (CSIT) proposed and implemented a major redesign of the system. It made more extensive use of HP instruments and components, modified the test fixtures for better shielding and immunity to RF signals deterioration due to contact wear, and reprogrammed the control and measurement functions in HP VEE. The result was a first system delivered, debugged and taken on line, in production, within 12 weeks. Every subsequent duplicate system has been taken on line within two days of installation on the manufacturing floor. HP also delivered a custom written "Health Check" program with a test fixture terminator. These are used periodically to verify the integrity of the test systems and to detect relative test results drifts between like systems.

## **Summary**

This is an excellent example where Hewlett Packard's expertise in functional test has greatly benefited and complemented another electronics equipment manufacturer. HP's experience in product testing in the very high frequency spectrum (1GHz in this case), was a major factor in eliminating the manufacturer's problems encountered from electrical noise pick up and unreliable measurements, due to questionable contacts, at the test points. HP's key contribution was the ability to duplicate and install additional test systems in two days as compared to two months as experienced by the manufacturer from its own test engineering department, and with much better confidence in the reliability of the measured test data.

## **Key System Features**

- Low Noise Custom Test Fixturing
- Excellent test results correlation between systems
- Two days installation and commissioning of duplicate systems

## **Typical System Configuration**

### **Test Hardware**

- Switch/Test Unit
- Switch/Control Unit
- System Power Supply
- Signal Generator
- Digital Multimeter
- High Performance Universal Counter
- Modulation Analyzer
- Audio Analyzer
- Function Synthesizer
- Customer supplied test sequencer
- HP designed Custom RF Test Tray

### **Computer/Software**

- HP Vectra 486/66MHz PC
- Keyboard, Monitor and Mouse (for System verification only)
- Software - DOS, HP VEE
- HP Custom System Software