

# Keysight Technologies

## DME Uses N6700 Power Supplies to Help Military Test Radios in the Field

### Case Study



The DME ATACTS system incorporates an continued Keysight N6700 low-profile modular power system.

The complexity of military radios and the often harsh weather conditions on the front lines mean that radio reliability is a serious problem. To address the problem, defense electronics firm DME Corporation built a test system, known as the Advanced Tactical Agile Communications Test Set, or ATACTS, for testing military radios in the field.

ATACTS combines the operations of 12-16 different virtual test instruments into a single, compact unit. The system, which incorporates a Keysight Technologies, Inc. N6700 low-profile modular power system, is small enough that it can be used in the field, either rack mounted or on a bench top. The synthetic, software-based ATACTS system can be quickly adapted to handle new radios or new modulation formats without having to change the test system's hardware.

### Testing the DUT

DME's synthetic radio tester is capable of testing multiple radios, including single channel ground and airborne radio systems (RT-1702s, PRC-117s and more). ATACTS does a complete test of each radio, including measuring the current the radio draws during transmission and in a static state. It is a synthetic tester that digitizes the IF (intermediate frequency), modulates, demodulates, and filters the data within the digital realm.

Technicians just plug the radio-under-test into ATACTS and the system puts it through the predefined tests. ATACTS uses a variety of digital interfaces – Ethernet, 1553, RS-232, programmable I/O – to communicate with the radio and its subcomponents, to put it into the different modes required for testing. The only external equipment it currently uses is the N6700 low-profile modular power supply, which is connected via USB.

Some radios require as many as five different voltages, in which case DME engineers pull four of them off the N6700 power supply and pick up the fifth voltage – typically a low-power one – from ATACTS itself. When they need more than 100 or 150 watts to power a particular radio, DME engineers use the N6700's virtual channel feature to easily parallel up to three units, which are then controlled as if they were a single output. ATACTS interfaces with the N6700 via USB.

DME works with its military customers and OEMs to establish and validate test procedures for each radio that ATACTS will test. Depending on the approved procedures, a typical test scenario might include measuring the RF output of the radio, the modulation (whether it is an FM deviation or percent AM modulation, hopping or non-hopping), bit error rate (BER), and the frequency stability of the output signals, then testing the RF input of the radio by providing a modulated signal to the radio and validating the audio or digital signals out of the radio to check that the proper signals occurred. By using the stimulus and response capabilities of the ATACTS system, a technician can validate that multiple types of radios are working properly.

The relay disconnect and current measurement capabilities of the N6700 are valuable assets for testing the radios. The relay disconnect allow the ATACTS to perform a safe-to-turn-on test prior to applying power to the radio without any operator intervention. Then the current measurement feature provides simple and effective monitoring of the radio's current draw without the need of sense resistors in the cabling.

Technicians use the results of these tests to determine if a radio is usable or if it needs to be sent back to the depot for repair.

## Why DME chose a Keysight power supply

DME wanted a power supply that was 1-2U high and had three to five programmable outputs. "We looked at what was on the market and we couldn't find a supply that had the capability we needed that also met our size criteria, so we looked at designing our own," said Craig Hughes, DME engineering director. Shortly after the N6700 was introduced, one of Craig's teammates stumbled upon a description of it in a trade publication. He brought it to Craig and said "Here's your answer."

"Once we got the information and the pricing on it, we realized it made no sense for us to design our own supply," said Craig. "It did everything we wanted to do, including variable voltage and variable current. We can measure the current, we can measure the voltage back, and we can configure it in parallel and series mode if we need to for the various radios or UUTs that we might be required to work with."

Another important factor in the decision-making process was the N6700's USB port that lets ATACTS talk to the power supply. "That was the easiest way for us to hook up," said Craig.

The most important feature? "For us it was strictly size and capability," said Craig. "You can always get the capability, but combining it with the size was key to our decision to use this supply."

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