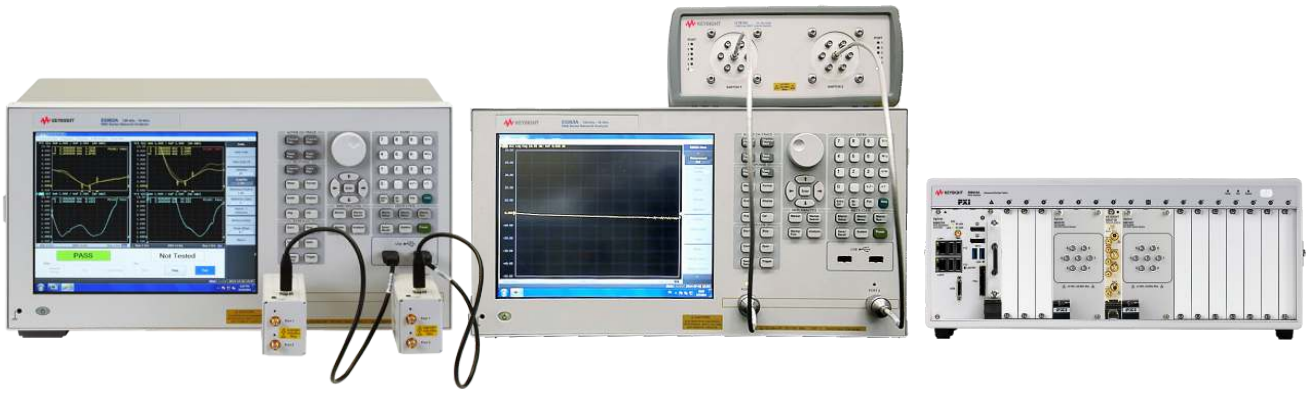
Keysight Technologies
Handset Antenna Test Solutions

Solution Brochure



KEYSIGHT TECHNOLOGIES

Application Requirements

As standards for wireless communications increase, multiple antennas are now required to be installed in every handset. The type of the antenna varies, such as laser direct structuring (LDS), flexible printed circuit (FPC), or cable. To control the quality of these antenna products, antenna manufacturers are required to measure their return loss or VSWR during the manufacturing process.

Handset Antenna Test Challenges

As smartphone terminal shipments grow, high-volume production for handset antenna testing increases as well. Antenna manufacturers are experiencing increased pressure to reduce the cost-of-test and increase testing capacity without increasing factory space. Some manufacturers need the ability to test multiple antennas as many of the smartphone models are adopting in-molding antennas (IMA) that are embedded in the smartphone case. To achieve this, one would need to consider how to reduce the test cost for each test fixture (test station) and how to setup a low-cost multiport DUT test system.

Solutions

One low cost and effective solution would be to share a single test system with multiple test fixtures. We refer to this as a multi-site test system. You can connect either a single antenna test fixture or a multiport DUT test fixture by incorporating RF switches. Figure 1 shows a multiport and/or multi-site test system.

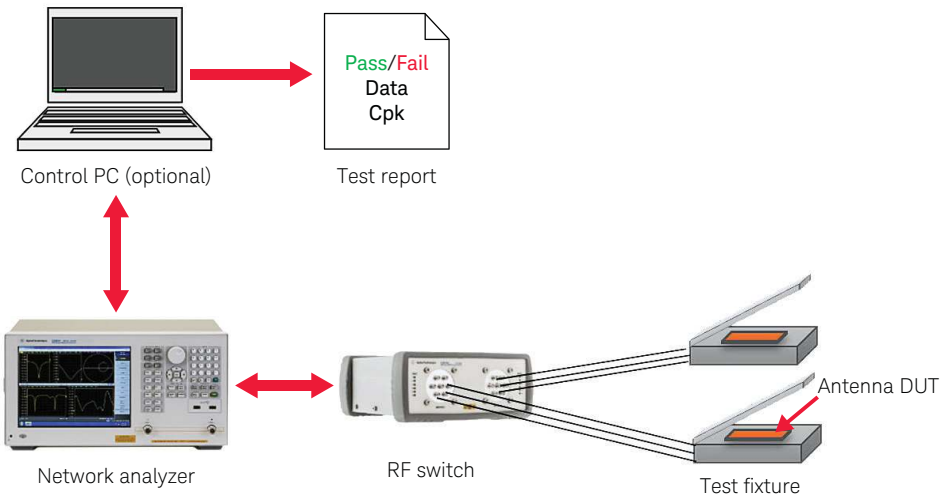


Figure 1. Test system image for multiport/multi-site

Keysight antenna test solutions provide:

- Up to 12 ports for multiport/multi-site measurements
- Complete multi-site antenna test system, including a network analyzer, high reliability switches, and pass/fail test software
- Various frequency options help minimize the initial cost investment, and frequency upgrade options are available when higher frequencies are required.
- USB foot switch can be used for measurement trigger

Keysight handset antenna test solutions include: the E5063A ENA series network analyzer bench-top systems and the M937xA PXI VNA based systems. The E5063A ENA solution supports up to 18 GHz with three frequency range options. The E5063A with Option 011 operates as a PCB analyzer that helps you troubleshoot FPC antenna device failures with impedance (TDR) measurement capability. The PXI VNA solution supports up to 26.5 GHz with six frequency range options, and the ability combine PXI VNA modules and switches in one chassis.

Table 1. Typical system configuration

				
Number of DUT	2	4	12	12[1]
Network analyzer	E5063A-285	E5063A-285	E5063A-285	M9371A
RF switches	None	U1810B x2	U1816A	M9157C x2
PXI chassis	n/a	n/a	n/a	M9018A
PXI controller	n/a	n/a	n/a	M9037A

1. Extend the number of test ports by adding PXI switches to a PXI VNA system.

The reference solutions are provided with example software that is coded by VB.NET. The software runs on an external PC or on the E5063A ENA, and provides test operation features such as measurement and test limit setting, guided ECal operation, Pass/Fail indicator, and test report generation. This allows you to evaluate the system immediately and customize the operation and test report format to your specific needs. Figure 2 shows the software user interface.

Multiport/multi-site test screen

Guided operations

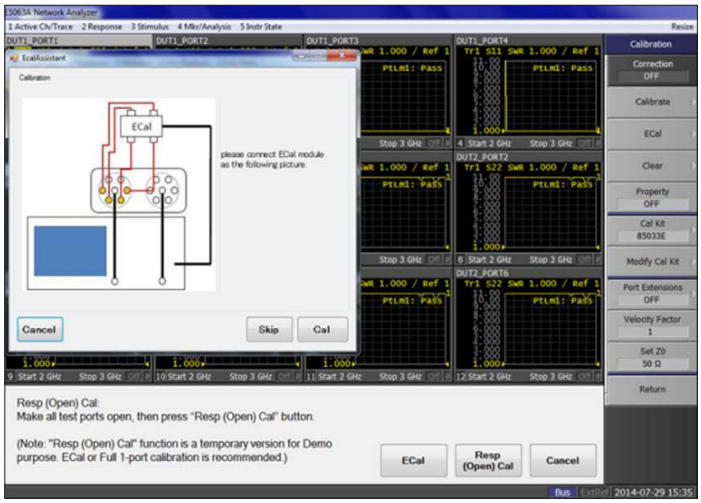


Figure 2. Software UI image on E5063A

Drive Down the Cost of Test

Keysight's handset antenna test solutions are complete solutions for multiport or multi-site antenna tests at an affordable price. Figure 3 shows the instrument cost and the cost per port (= Instrument cost / the number of test ports) for our systems described in Table 1. As the instrument cost does not vary much between a standalone VNA and a multiport/multi-site system, the cost per port is significantly decreased while increasing the number of test ports available. You can drive down the cost-of-test by adopting Keysight's handset antenna test solutions.

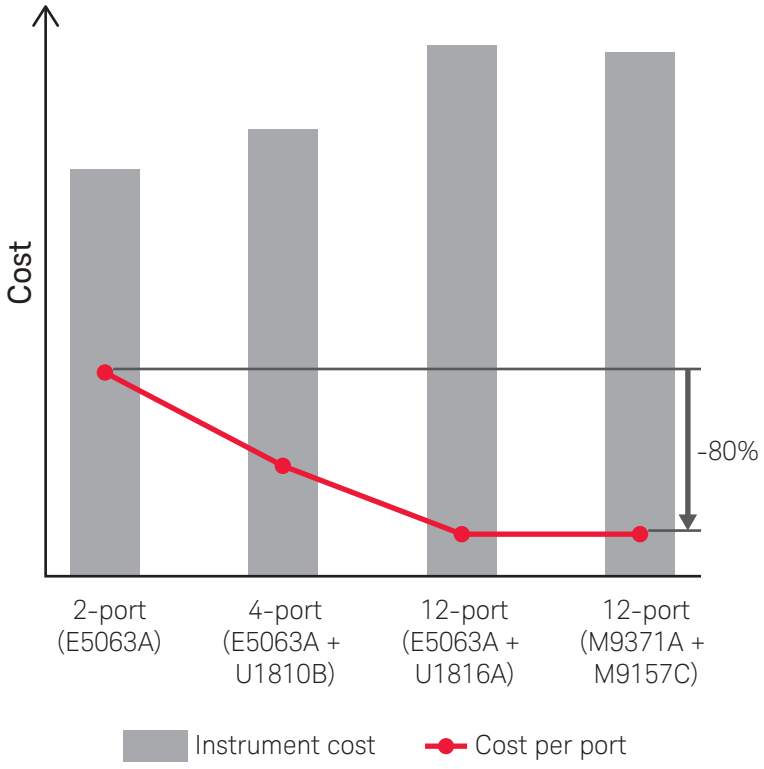


Figure 3. Cost per port (Instrument cost / # of test ports)

Product	Description
E5063A	**ENA Series Network Analyzer**
E5063A-245	100 kHz to 4.5 GHz
E5063A-285	100 kHz to 8.5 GHz
E5063A-2H5	100 kHz to 18 GHz
E5063A-011	Time domain analysis/test wizard option for PCB analyzer
U181x	**USB Coaxial Switch**
U1810B	USB coaxial switch, DC to 18 GHz, SPDT (unterminated)
U1816A	USB coaxial switch, DC to 8 GHz dual SP6T (terminated)
U1816C	USB coaxial switch, DC to 26.5 GHz dual SP6T (terminated)
M937xA	**PXIe Vector Network Analyzer**
M9370A	300 kHz to 4 GHz
M9371A	300 kHz to 6.5 GHz
M9372A	300 kHz to 9 GHz
M9373A	300 kHz to 14 GHz
M9374A	300 kHz to 20 GHz
M9375A	300 kHz to 26.5 GHz
M9018A	PXIe 18-slot chassis
M9037A	PXIe high performance embedded controller
M9157C	PXI single SP6T switch, DC to 26.5 GHz (terminated)
	Electronic Calibration (ECal) Module
85093C	300 kHz to 9 GHz, 2-port
N4431B	9 kHz to 13.5 GHz, 4-port
N4433A	300 kHz to 20 GHz, 4-port
N4691B	300 kHz to 26.5 GHz, 2-port
	Mechanical Calibration Kit
85033E	DC to 9 GHz, 3.5 mm
85052D	DC to 26.5 GHz, 3.5 mm

Web Resources

Handset Antenna Test:
www.keysight.com/find/handset-antenna

E5063A ENA:
www.keysight.com/find/e5063a

M937xA PXI VNA:
www.keysight.com/find/pxivna

U181x USB Switches:
www.keysight.com/find/USBswitch

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www.pxisa.org
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