

Measuring Antenna Pattern with the Anritsu S412E

Introduction

The Anritsu S412E can be used to measure and verify antenna patterns with a single operator. The operator is located at the antenna under test end where a test CW signal is transmitted. The S412E is located far enough away from the test antenna in "Far field" conditions. Measurements on the S412E are initiated and observed by the operator on a smart phone. The remote operation and viewing is made possible by the Ethernet interface with web server on the S412E. For more information on this see Anritsu Spectrum Master with Web Remote Tools 11410-00846.

In figure 1 the S412E is connected to the internet allowing the antenna under test to be many miles from the S412E.

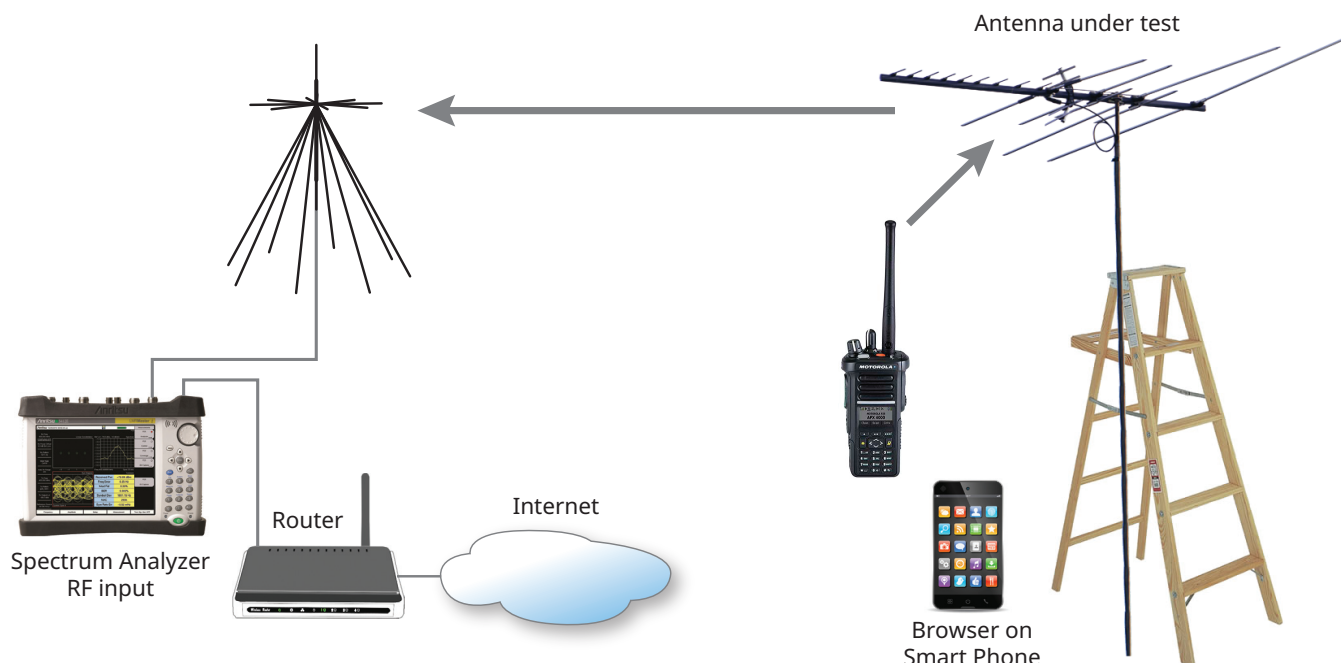


Figure 1: Block Diagram for Antenna Pattern Measurement with the S412E connected to the Internet

The S412E is used to measure the signal strength from the distant antenna under test. Figure 2 shows a photograph of the receive set up. The Ethernet interface on the receive unit is connected to the Internet through a router. The S412E with Ethernet interface includes a web enabled interface for all of its measurement modes. For antenna pattern measurements the receive unit will be set to spectrum analyzer mode, zero span, 30 second sweep speed.

The level of the CW transmitter should be sufficient to be received at the S412E end. The operator will set up the S412E using the browser on a smart phone. The browser would be set to the external Internet IP address for the receive S412E. Using the browser, the receive unit would be set to single sweep in zero span mode. Sweep time should be slow enough to match the rotation of the test antenna. As the sweep begins the antenna would be rotated 360 degrees. The resulting measurement trace on the remote unit can be viewed on the smart phone display and saved as needed.

Antenna pattern measurements are often made in remote locations to prevent over the air signals from interfering with the measurements and the test signals from interfering with others.

The S412E can be used as a WiFi "Measurement WiFi Hot Spot" with the addition of a small USB powered WiFi router. With this setup the smart phone can be used to operate the S412E without an internet connection.



Figure 2: Showing the S412E connected to the internet through a router and an omnidirectional test antenna.

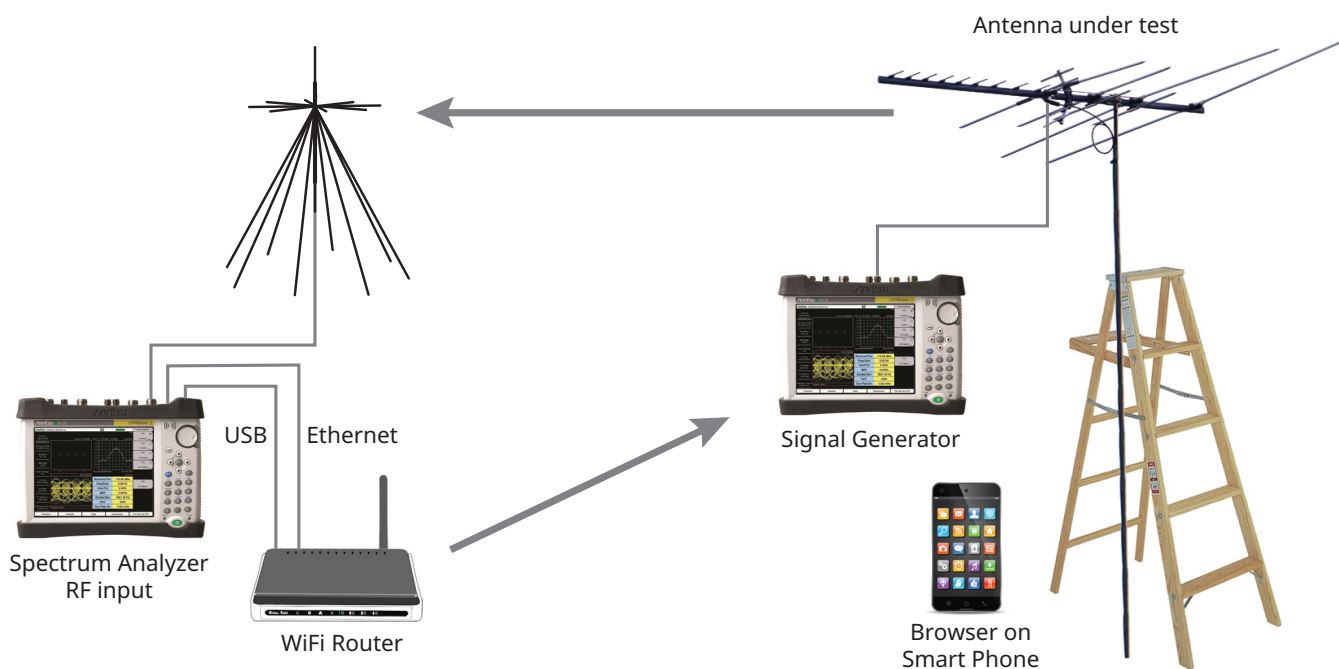


Figure 3: Block Diagram of S412E as a Measurement "Hot Spot"



Figure 4: S412E with a WiFi router and omni directional antenna



Figure 5: Close up of the Wifi Router



Figure 6: Antenna under test end

The precision signal generator on a second S412E can be used to drive the antenna under test.

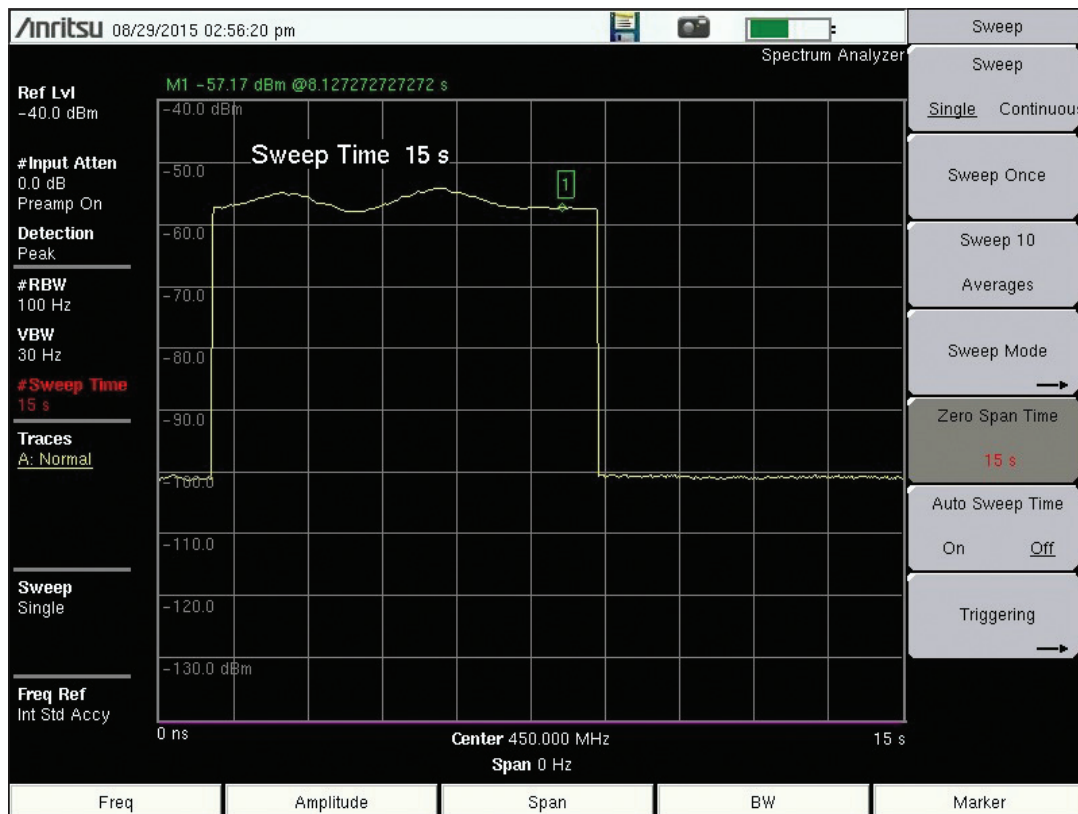


Figure 7: Antenna signal strength measurement while the test antenna is rotated 360 deg.

Using the smart phone control the zero span sweep is started on the remote S412E. Then the signal turned on at the test antenna. Once the antenna is rotated 360 degrees the signal was turned off. The on and off are used as markers help indicate the antenna direction.

The example test antenna is an Andrew CommScope DB408 with an elliptical pattern. The measurements indicated a 3 dB difference between front and side directions.

Summary

The S412E with Ethernet interface and web server supports the measurement of distant receive levels from the location of a rotating test antenna. This process allows a signal operator to do quick assessments of antenna performance.



• **United States**

Anritsu Company

1155 East Collins Boulevard, Suite 100,
Richardson, TX, 75081 U.S.A.
Toll Free: 1-800-267-4878
Phone: +1-972-644-1777
Fax: +1-972-671-1877

• **Canada**

Anritsu Electronics Ltd.

700 Silver Seven Road, Suite 120,
Kanata, Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• **Brazil**

Anritsu Eletrônica Ltda.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - São Paulo - SP - Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• **Mexico**

Anritsu Company, S.A. de C.V.

Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

• **United Kingdom**

Anritsu EMEA Ltd.

200 Capability Green, Luton, Bedfordshire LU1 3LU, U.K.
Phone: +44-1582-433280
Fax: +44-1582-731303

• **France**

Anritsu S.A.

12 avenue du Québec, Batiment Iris 1-Silic 612,
91140 Villebon-sur-Yvette, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

• **Germany**

Anritsu GmbH

Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

• **Italy**

Anritsu S.r.l.

Via Elio Vittorini 129, 00144 Roma Italy
Phone: +39-06-509-9711
Fax: +39-06-502-2425

• **Sweden**

Anritsu AB

Kistagången 20B, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

• **Finland**

Anritsu AB

Teknobulevardi 3-5, FI-01530 VANTAA, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

• **Denmark**

Anritsu A/S

Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark
Phone: +45-7211-2200
Fax: +45-7211-2210

• **Russia**

Anritsu EMEA Ltd.

Representation Office in Russia

Tverskaya str. 16/2, bld. 1, 7th floor.
Moscow, 125009, Russia
Phone: +7-495-363-1694
Fax: +7-495-935-8962

• **Spain**

Anritsu EMEA Ltd.

Representation Office in Spain

Edificio Cuzco IV, Po. de la Castellana, 141, Pta. 8
28046, Madrid, Spain
Phone: +34-915-726-761
Fax: +34-915-726-621

• **United Arab Emirates**

Anritsu EMEA Ltd.

Dubai Liaison Office

P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suite 701, 7th floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• **India**

Anritsu India Pvt Ltd.

2nd & 3rd Floor, #837/1, Binnamangla 1st Stage,
Indiranagar, 100ft Road, Bangalore - 560038, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

• **Singapore**

Anritsu Pte. Ltd.

11 Chang Charn Road, #04-01, Shiro House
Singapore 159640
Phone: +65-6282-2400
Fax: +65-6282-2533

• **P. R. China (Shanghai)**

Anritsu (China) Co., Ltd.

27th Floor, Tower A,
New Caohejing International Business Center
No. 391 Gui Ping Road Shanghai, Xu Hui Di District,
Shanghai 200233, P.R. China
Phone: +86-21-6237-0898
Fax: +86-21-6237-0899

• **P. R. China (Hong Kong)**

Anritsu Company Ltd.

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong, P. R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

• **Japan**

Anritsu Corporation

8-5, Tamura-cho, Atsugi-shi,
Kanagawa, 243-0016 Japan
Phone: +81-46-296-6509
Fax: +81-46-225-8359

• **Korea**

Anritsu Corporation, Ltd.

5FL, 235 Pangyoeyeok-ro, Bundang-gu, Seongnam-si,
Gyeonggi-do, 463-400 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• **Australia**

Anritsu Pty Ltd.

Unit 21/270 Ferntree Gully Road,
Notting Hill, Victoria 3168, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• **Taiwan**

Anritsu Company Inc.

7F, No. 316, Sec. 1, Neihu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

