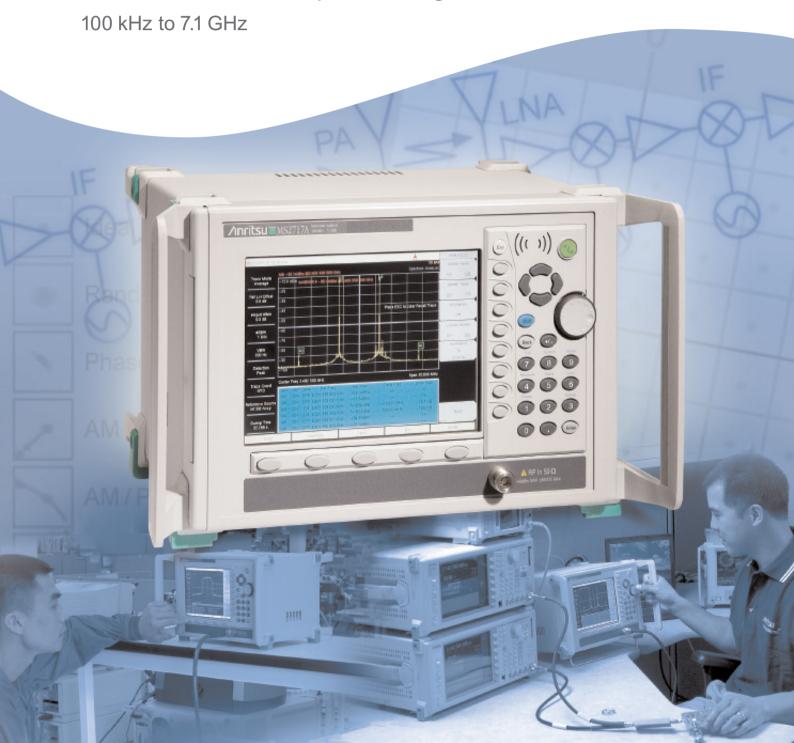


MS2717A Economy Spectrum Analyzer

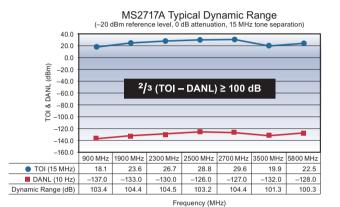
Advanced Spectrum Analysis for Manufacturing, R & D and General Purpose Testing



Evaluate RF Components and Systems Accurately and Affordably with the MS2717A Economy Spectrum Analyzer

Manufacturing and design engineers face extraordinary pressure to ship lower-cost RF components. To complicate matters, these components must provide outstanding linearity for wireless links to support the emergence of higher data-rate formats such as WCDMA/HSDPA, TD-SCDMA, and WiMAX. For testing these components, it's easy to simply recommend a spectrum analyzer in terms of performance and functionality. But it's difficult to justify the expense to upper management. Enter the MS2717A Economy Spectrum Analyzer, a higher-performance, lower-cost alternative.



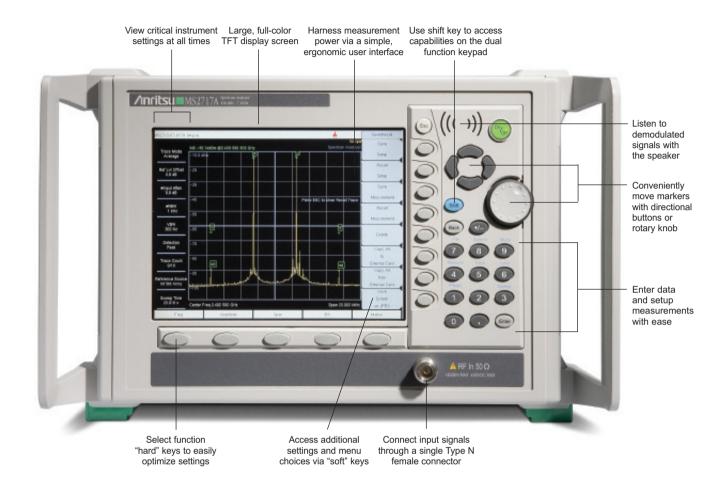


With as much as 100 dB dynamic range, the MS2717A Economy Spectrum Analyzer has the performance to optimize measurements for both accuracy and speed. With typical phase noise of –110 dBc/Hz for offsets between 10 kHz and 100 kHz, the MS2717A's superb spectral purity simplifies oscillator testing and delivers superior EVM measurement capabilities.

While the MS2717A occupies very little space on the bench, don't let the small footprint fool you. This instrument is packed with performance and features designed to improve productivity, increase production yields, and lower cost-of-test. It also offers optional WCDMA/HSDPA RF measurements and WCDMA demodulation analysis for affordable pass/fail testing of the popular adjacent channel leakage ratio (ACLR), occupied bandwidth (OBW), error-vector magnitude (EVM), and spectral emission mask tests. Best of all, the MS2717A Economy Spectrum Analyzer's superior performance is available at a surprisingly affordable price. Whether you're involved with manufacturing testing or R & D, you'll find it delivers advanced spectrum analysis with outstanding value.

Feature	Benefit	
Broad frequency range (100 kHz to 7.1 GHz)	Embraces a large number of wireless communications standards	
Wide dynamic range (up to 100 dB)	Enables faster testing of wireless components that require exceptional linearity	
Excellent spectral purity, with typical phase noise of –110 dBc/Hz at 10 kHz offset	Increase repeatability and throughput of local oscillator testing	
Wide 8 MHz capture bandwidth	Comprehensive WCDMA/HSDPA RF measurements and WCDMA demodulator offers affordable transmitter testing to modern standards	
Ergonomically designed controls	Easy-to-learn and easy-to-use for optimizing operator productivity	
Surprisingly affordable price	Outstanding value for lowering cost-of-test and reducing capital equipment expenditures	

Introducing the MS2717A Economy Spectrum Analyzer



Feature	Benefit	
Lightweight and small footprint	Operators can safely optimize working environments for maximum space	
Large 8.4 in. full-color TFT display screen	At-a-glance results and instrument settings improves operator productivity	
Type N female RF connector	Easy-to-connect with proven reliability in severe manufacturing environments	
Soft keys, directional buttons, and rotary knob	Tactile feedback enables precise control of instrument settings and measurement results	
LAN and USB 2.0 (full-speed) connections	Latest connections to networks and PCs for remote programming and transfer of data	
Rear-panel BNC connectors for hookup of external trigger and timebase synchronization	Easily integrates into existing manufacturing environments	
64 MB storage	Store and easily access more than 1,000 traces and 1,000 measurement setups	

Manufacturing Environments Demand Economical Spectrum Analysis Solutions



Manufacturing engineers in search of test solutions judge economy in terms of cost-of-test and cost-of-ownership. Other low-cost instruments sacrifice performance to slash cost-of-test of wireless RF components. No sacrifices are necessary with the MS2717A Economy Spectrum Analyzer. Its outstanding performance truly belies its "economy" label. Production lines everywhere can upgrade their capabilities and lower their costs.

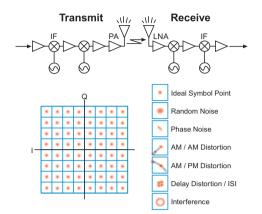
This manufacturing-friendly instrument features high performance, abundant capabilities, and reasonable price. The MS2717A is an essential tool for low-cost manufacturing test that economically delivers superior spectrum analysis capabilities at a time when it's needed most.



Here's a quick look at some of the manufacturing benefits:

Feature	Benefit	
Rugged design, proven technology, and room to upgrade	Lower cost-of-ownership with excellent reliability, ensuring minimal downtime on production lines	
An input damage level of +43 dBm	Supports both infrastructure and mobile-device signal levels for nearly indestructible capabilities in manufacturing	
Third-order intercept (TOI) to +29 dBm DANL (with preamp): -160 dBm, normalized to 1 Hz Low phase noise of -110 dBc/Hz at 10 kHz offsets Typical amplitude accuracy of ±0.6 dB to 3 GHz	Lower cost-of-test with outstanding spectrum analysis performance that increases repeatability and offers increased margins for "money" specifications	
10 Hz to 3 MHz resolution bandwidths (RBWs)	Lower cost-of-test by using superior dynamic range to increase resolution bandwidth and overall throughput	
Eight built-in languages	Improves operator productivity anywhere by choosing popular local languages for the user interface	
Modern connectivity, including LAN, USB 2.0 (full-speed), and Compact Flash	Simplify remote control, data transfer, and firmware upgrades	

Engineering Environments Require Advanced Capabilities and Flexibility



Higher data-rate transmit and receive designs utilize amplifiers, mixers, oscillators, and power amplifiers that can distort signals if not designed and manufactured to high standards.

With all of its measurement performance and capability, the MS2717A Economy Spectrum Analyzer is hardly limited to the production floor. General purpose test users throughout the world are facing increased bandwidths and data rates for systems with higher-order modulation formats using in-phase (I) and quadrature (Q) techniques. But even though competitive markets are demanding RF components for less, they must still provide high performance for these systems. And instrument makers are challenged to test and verify component performance faster and at lower costs.

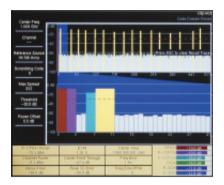
Fortunately, with its superior performance, engineers can precisely characterize their designs in terms of both spectral responses and transmitter quality using a single instrument. The same instrument used to validate design performance can simply and easily verify manufacturing performance. The advanced capabilities and affordable performance of the MS2717A Economy Spectrum Analyzer ensures smooth transition from design to production, improving not only time-to-market but time-to-volume profitability.



Benefits for the R & D environment:

Feature	Benefit	
Excellent dynamic range and phase noise performance	Precisely characterize linearity of active devices and performance of local oscillators	
Superior spectrum and optional modulation analysis capabilities	Affordable instrumentation for general purpose or production recommendations in verifying linearity specifications	
A total of 65 dB attenuation in 5 dB steps	Optimize dynamic range for best accuracy and overall throughput	
Smart WCDMA/HSDPA RF and WCDMA demodulator measurements	One button measurements for accurate WCDMA RF and demodulator measurements on selected Node B transmitters	
Total marker flexibility: 6 markers, 7 marker modes, and marker table display	Sophisticated marker functions offer flexible options to quickly extract measurement results	
Save output displays in JPG file formats	Record displays in popular small file types for later presentation and distribution	

Perform Modern Modulation Analysis with the MS2717A Economy Spectrum Analyzer



The MS2717A simplifies testing of Node B transmitters. As an example, the Code Domain Power measurement offers automated single-display demodulation results that are easy-to-decipher.

The MS2717A Economy Spectrum Analyzer is much more than just another spectrum analyzer. In addition to making swept spectrum measurements, engineers and technicians can rely on this tool to accurately measure RF transmitter and modulation quality on critical components, such as the power amplifier, as defined in the 3GPP specification (TS 125.141).

By enabling WCDMA/HSDPA RF Measurements (Option 44), the superior dynamic range offers the capability to quickly characterize RF transmitter performance using built-in smart measurements. These one-button transmitter test choices include automatic ACLR, Spectral Emission Mask, and RF Summary measurements.



By enabling its WCDMA Demodulator (Option 45) capability, the excellent phase noise of the MS2717A makes it possible to precisely determine a signal's modulation quality using built-in smart measurements. These one-button modulation-quality choices include automatic Code Domain Power (CDP), Codogram, and **Modulation Summary** measurements.

With Options 44 and 45 and an external vector signal generator such as the Anritsu MG3700A, the MS2717A Economy Spectrum Analyzer can display more than 20 key WCDMA/ HSDPA RF and WCDMA demodulator measurements at the touch of a button.

Check out these modulation analysis benefits:

Feature	Benefit	
Wide 8 MHz capture bandwidth Typical residual ACLR of –60 dB Typical residual EVM of 1.75% True RMS detection	Comprehensive WCDMA/HSDPA testing to 3GPP specifications (TS 125.141) at a cost that's up to three times less than higher-priced alternatives	
Easily recall five 3GPP test models for automated Pass/Fail testing	Increase operator productivity with smart, automated tests that simplify transmitter testing	
Excellent timebase accuracy (±0.3 ppm) using ovenized crystal reference (Option 9)	Verify performance to 3GPP frequency accuracy specifications	
Smart measurements for WCDMA/HSDPA transmitter analysis (Option 44)	One button measurements simplify basic RF transmitter testing	
Smart analysis using WCDMA demodulator (Option 45)	One button measurements demodulate WCDMA signals for detailed transmitter measurements	

Software-Aided Spectrum Analysis

Enlist Master Software Tools and a PC for expanded measurement functionality.

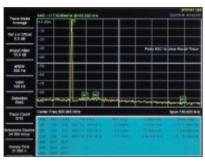
Each instrument ships with a test assistant: a copy of Anritsu's Master Software Tools™ for Windows® 2000/XP. This allows an operator to add the processing capabilities of a PC and this software to the MS2717A Economy Spectrum Analyzer to form a powerful and flexible measurement solution.



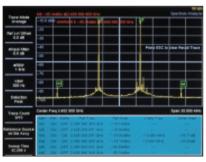
Benefits of Master Software Tools with the MS2717A Economy Spectrum Analyzer:

Feature	Benefit	
Powerful data management tool for storing and sifting through measurement results	Simple-to-learn software transfers, manages, prints, and archives displays and setups	
Store an unlimited number of setups, traces, and JPEGs (limited only by PC memory)	Develop libraries of frequently used setups and typical results	
Overlay traces and further optimize displays	Easy post-processing capabilities offers versatility to further optimize results	
Add, edit, and manage limit lines using Master Software Tools	Powerful Pass/Fail assistant	
Connect to a PC using USB 2.0 (full-speed), Ethernet LAN, or Direct Ethernet	Flexible connectivity ensures an easy connection to the Economy Spectrum Analyzer	
Update with the latest firmware	Easily access and upgrade with the newest features from www.us.anritsu.com	

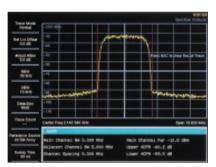
Typical Spectrum Analysis Measurements at a Glance



Phase noise measurements are the hallmark of the MS2717A



Intermodulation distortion measurements are faster and more precise with the MS2717A



Automated Adjacent Channel Power Ratio (ACPR) measurements are standard in the MS2717A

Popular Spectrum Analysis Measurements

The following three examples highlight the most popular measurements using the MS2717A Economy Spectrum Analyzer.

Phase Noise

Connect to the MS2717A and observe the true spectral purity of your local oscillators and synthesizers. The MS2717A Economy Spectrum Analyzer, with typical phase noise of –110 dBc/Hz at 10 kHz offset, affordably verifies your most demanding phase noise specifications. Use flexible phase noise markers and convenient marker table features to further optimize, observe, and archive measurement results.

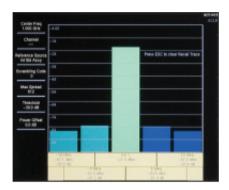
Intermodulation Distortion (IMD)

Combine the MS2717A's outstanding dynamic range (up to 100 dB) with two signal generators to accurately characterize the linearity of most amplifiers in terms of third-order intercepts (TOIs). Wide dynamic range means you can use wider resolution bandwidths to increase the sweep speed of this normally time-consuming measurement. With six markers and an easy-to-read marker table, the MS2717A reveals the true performance of your amplifier at an affordable price.

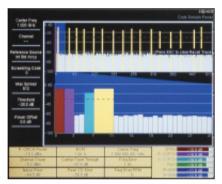
Adjacent Channel Power Ratio (ACPR)

Characterizing transmitter performance demands high-performance instruments and skilled operators for setup. The MS2717A Economy Spectrum Analyzer's combination of superior dynamic range and automated one-button measurement capabilities reduces test times and increases operator productivity. Use the MS2717A to automatically measure and display ACPR results, truly revealing transmitter performance.

Typical Modulation Analysis Measurements at a Glance



Automated WCDMA Adjacent Channel Leakage Ratio (ACLR) measurements are optional in the MS2717A



Minimize keystrokes with a single MS2717A display containing critical WCDMA demodulated results

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	DECTOR.	Marine	Panel
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Quickly verify performance to 3GPP test models with the MS2717A Economy Spectrum Analyzer

Popular Modulation Analysis Measurements

When upgraded with modern WCDMA capabilities, the following three examples highlight the most popular modulation measurements using the MS2717A Economy Spectrum Analyzer.

Adjacent Channel Leakage Ratio (ACLR)

Add powerful WCDMA ACLR measurement capability to the MS2717A and replace other slower, more keystroke-intensive approaches. Use the MS2717A's automated WCDMA ACLR screen to observe main channel power as well as the power levels of adjacent channels according to the 3GPP standard (TS 125.141). The MS2717A continuously updates the screen's bars and marker readouts for easy-to-read results. Similarly, the MS2717A can also make multi-channel ACLR measurements with as many as four main channels and four adjacent channels.

Code Domain Power (CDP)

The MS2717A's Code Domain Power (CDP) screen makes it easy to view overall WCDMA modulation quality. The MS2717A automatically demodulates and refreshes the CDP screen with critical modulation parameters to verify performance to the 3GPP standard. The MS2717A also has flexible zoom features to conveniently observe results with higher resolution.

Pass/Fail Mode

Replace operator-intensive demodulation testing with the MS2717A's automated Pass/Fail mode. After selecting one of five available test models, an operator can view a test summary with clear Pass/Fail indications, min/max thresholds, and actual measurement results. This clear and concise summary allows an operator to quickly determine 3GPP performance or isolate problematic performance areas for more comprehensive testing.

MS2717A Economy Spectrum Analyzer Specifications

Frequency		
Frequency Range, Tuning Resolution	100 kHz to 7.1 GHz, 1 Hz	
Frequency Reference	Aging ±1 ppm/10 years Accuracy ±1 ppm (+25°C ±25°C) + aging (Standard) Accuracy ±0.3 ppm (+25°C ±25°C) + aging (Option 9)	
Frequency Span	10 Hz to 7.1 GHz plus 0 Hz (zero span)	
Sweep Time	Minimum 200 ms, 10 μs in zero span	
Sweep Trigger	Free run, Single, Video, External	
Resolution Bandwidth	(-3 dB width) 10 Hz to 3 MHz in 1-3 sequence ±10%	
Video Bandwidth	(-3 dB) 1 Hz to 3 MHz in 1-3 sequence	
SSB Phase Noise	-100 dBc/Hz max at 10, 20 & 30 kHz offset from carrier -102 dBc/Hz max at 100 kHz offset from carrier	
Capture Bandwidth	8 MHz	
Amplitude		
Measurement Range	DANL to +30 dBm	
Overall Amplitude Accuracy (95%) 20–30 °C, 10 dB input attenuation, preamplifier off, 0 dBm to –50 dBm	±0.9 dB, 100 kHz to 3 GHz ±1.25 dB, >3 GHz to 7.1 GHz	
Displayed Average Noise Level (DANL in 10 Hz RBW, 0 dB attenuation, preamp on)	Frequency Typical Max 10 MHz to 1 GHz -155 dBm -151 dBm >1 GHz to 2.2 GHz -152 dBm -149 dBm >2.2 GHz to 2.8 GHz -147 dBm -143 dBm >2.8 GHz to 4.0 GHz -150 dBm -149 dBm >4.0 GHz to 6.5 GHz -150 dBm -144 dBm >6.5 GHz to 7.1 GHz -149 dBm -144 dBm	
Display Range	1 to 15 dB/div in 1 dB/steps, Ten divisions displayed	
Amplitude Units Log Scales Modes	dBm, dBV, dBmv, dBμV	
Attenuator Range	0 to 65 dB	

WCDMA/HSDPA Specifications

Frequency Range	824-894 MHz, 1710-2170 MHz	2300–2700 MHz	
CDMA/HSDPA RF Measurements (Option 44, requires Option 9)			
RF Channel Power (15°C to 30°C)	±0.7 dB typical (±1.25 dB max)	±0.7 dB typical (±1.25 dB max)	
Occupied Bandwidth	±100 kHz	±100 kHz	
Residual Adjacent Channel Leakage Ratio (ACLR) ¹	–54 dB typical at 5 MHz offset –59 dB typical at 10 MHz offset	-54 dB typical at 5 MHz offset-57 dB typical at 10 MHz offset	
ACLR Accuracy	±0.8 dB for ACLR ≥-45 dB at 5 MHz offset ±0.8 dB for ACLR ≥-50 dB at 10 MHz offset	±1.0 dB for ACLR ≥–45 dB at 5 MHz offset ±1.0 dB for ACLR ≥–50 dB at 10 MHz offset	
Freqency Error	±10 Hz + Time Base Error 99% confidence level	±10 Hz + Time Base Error 99% confidence level	
WCDMA Demodulator (Option 45, requires Option 9)			
EVM Accuracy ¹	(3GPP Test Model 4) ±2.5%; EVM ≤25% (3GPP Test Model 5) ±2.5%; EVM ≤20%	±2.5% for EVM ≤20%	
Residual EVM	2.5% typical	2.5% typical	
Code Domain Power	±0.5 dB for code channel power ≥25 dB 16, 32, 64 DCPH (test model 1) 16, 32 DCPH (test model 2, 3)	±0.5 dB for code channel power ≥25 dB 16, 32, 64 DCPH (test model 1) 16, 32 DCPH (test model 2, 3)	
CPICH (dBm)	±0.8 dB typical	±0.8 dB typical	
Scrambling Code	3 seconds	3 seconds	

General Specifications

¹Depends on reference level, input signal level and single channel conditions

Maximum Continuous Input	10 dB attenuation, +30 dBm, ±50 VDC
RF Input VSWR	2.0:1 maximum, 1.5:1 typical (≥10 dB attenuation)
Interfaces	Type N female RF Connector BNC female connectors for external reference and external trigger RJ45 connector for Ethernet 10/100-Base T USB 2.0 (full-speed) Compact Flash 2.5 mm 3-wire cellular headset connector
Environmental	MIL-PRF-28800F Class 2 Operating: -10°C to 55°C, humidity 85% Storage: -51°C to 71°C Altitude: 4600 meters, operating and non-operating
Safety	Conforms to EN 61010–1 for Class 1 portable equipment
Electromagnetic Compatibility	Meets European Community requirements for CE marking
Size	14.7 x 9.6 x 13.4 in. (372 x 242 x 339 mm)
Weight	< 12 lbs. (5.6 kg) typical

Ordering Information

MS2717A

Economy Spectrum Analyzer

100 kHz to 7.1 GHz, including preamplifier

Standard 1-year warranty

Certificate of Calibration and Conformance



Options

MS2717A-009 Modulation Measurement and Demodulation

Hardware Upgrade

MS2717A-044 WCDMA/HSDPA RF Measurements

(Requires Option 009)

MS2717A-045 WCDMA Demodulator (Requires Option 009)

Standard Accessories

10580–00159 Anritsu User's Guide, Model MS2717A 2300–498 CD ROM containing Master Software Tools

2000–1360 USB A-mini B cable 2000–1371 RJ-45 Ethernet Cable 2000–1358 64 MB Compact Flash

Optional Rack Mount Kit

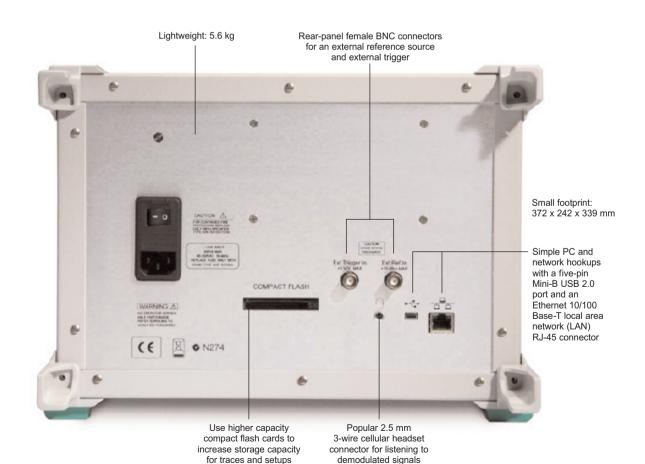
MS2717A-001 Rack Mount (no slides)

Optional Transit Case

760–240–R MS2717A Transit Case

Literature

10580–00159 Anritsu User's Guide, Model MS2717A 10580–00160 Anritsu Programming Manual, Model MS2717A





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