

# Wireless

## 1900 BSA TIA/EIA-136 Base Site Analyzer

**AEROFLEX**  
A passion for performance.



- Tri-Band, 400/800 MHz and 1900 MHz cellular and PCS test capability for TIA/EIA-136 systems
- "Crossband" duplex capabilities
- Test base station performance without taking the network off-line
- Cable connector kits for all popular base stations
- Automated base station testing software speeds testing and reduces training costs
- Constellation IQ display for quick assessment of base station transmitter digital modulation provided as standard equipment
- Optional "EasySpan" windows -based utility for extracting spectrum analyzer and tracking generator information to your PC for further analysis
- Accurate TDMA power measurement in accordance with TIA/EIA-136 specifications
- Easy to read color display simplifies analysis of complex protocols

*Patterned after the highly successful 1900 CSA, Aeroflex's flagship platform on which the world-wide TIA/EIA-136 (TDMA) family of wireless standards is supported. The 1900 BSA gives a powerful base site analyzer for your base station testing requirements.*

The 1900 BSA offers a complete suite of tools for comprehensive testing of TIA/EIA-136 dual mode base stations on all the world's cellular and PCS frequency assignments.

### TIA/EIA-136 Solutions

The 1900 BSA complies with TIA/EIA-136 Rev. 0, as published in October, 1998. The 1900 BSA features enhanced system processors and expanded file system, for high performance measurements.

With test features including low level power to -70 dBm and fully automated BER tests, as well as a new crossband duplex test feature for upbanded Lucent Series II base stations, the 1900 BSA is a complete TIA/EIA-136 test solution.

With a full featured complement of radio test set functions to 2 GHz, the 1900 BSA gives you frequency domain analysis to 2 GHz. Additionally, a spectrum analyzer and tracking generator covering the full frequency range comes as standard.

The 1900 BSA also offers a complement of traditional service monitor features including a 1 MHz digitized oscilloscope, a DVM and SINAD meter. In addition, the 1900 BSA provides function, frequency and channel tables, selectable IF filters and a wide variety of displays.

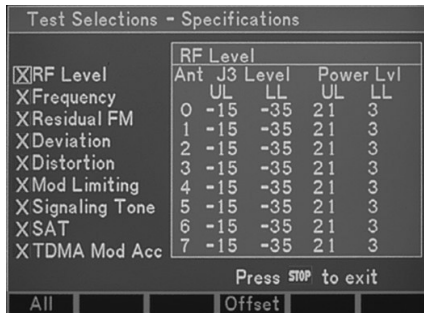
In addition to the full-band 2 GHz RF generator, the 1900 BSA also gives you additional capabilities including a comprehensive audio/data generator.

The instrument provides level control and monitoring facilities for modulation, and precise power measurement features for enhanced sensitivity and high accuracy testing needs.

Analog paging encoding/decoding, DTMF, tone coded squelch, digital squelch, AM modulation/demodulation with 2 separate AF generators and a cross band duplex feature gives you added test

For the very latest specifications visit **[www.aeroflex.com](http://www.aeroflex.com)**

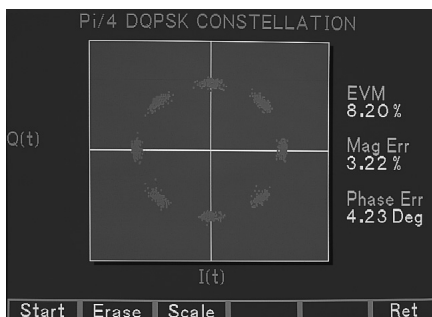
versatility.



*With robust features like, low level power, automated BER and full duplex capabilities, the 1900 BSA is the industry's most advanced TDMA base site analyzer.*

### IQ Constellation Display

The Aeroflex-1900 BSA provides you with a dynamic, high speed constellation display for precise RF modulation analysis of  $\pi/4$ DQPSK digitally modulated waveforms from 10 MHz to 2010 MHz. This unique 1900 BSA feature gives a near-real time display of digital modulation characteristics that helps isolate trouble spots in digital radio systems.



*IQ Constellation display allows for comprehensive digital modulation testing.*

### Analog Solutions

Engineered to be a true dual-mode test solution, the 1900 BSA also incorporates. AMPS base station signaling test features as well as standard radio measurements.

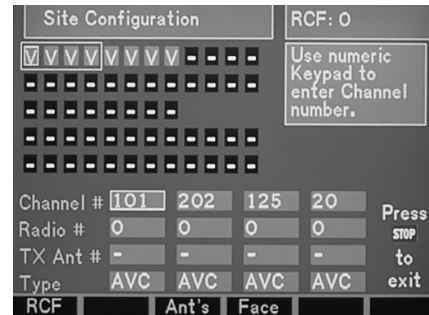
Optional base station testing routines, unique to each type of infrastructure, automate cell site test chores so that maximum network quality is easily maintained. Automatic test routines and user defined print-outs enhance manual mode testing.

Comprehensive control channel simulations, voice channel signaling, home/roam condition, SID assignments, SAT, DSAT, DST, DCC, SINAD reference points, RF power windows, and other helpful AMPS functions and signaling manipulation tools round out the instrument's analog test capabilities.

### Software Options Make Complex Testing a Snap

As with every Aeroflex test set, you get the advantage of Aeroflex applications engineering support.

Designed to automate and expand the functionality of your instrument, Aeroflex software options allow easy instrument upgrades when standards, definitions or test and service requirements change.



*Specialized AutoCell software automates testing of Lucent, Ericsson, Nortel and GE base site equipment.*

1900 BSA software options include:

- AC1009W – EasySpan is a Windows-based software utility which extracts spectrum analyzer and tracking generator traces from the Aeroflex-1900 BSA to a PC for further off-line analysis.
- AC1011 – Simultaneously analyzes the signal strength or channel activity of up to 3 voice channel groups or 100 frequencies.
- AC1012 – AutoCell 882 is a comprehensive test package for Ericsson model 882 base station transceivers.
- AC1017 – AutoCell-Series II is a comprehensive program for FCC compliance testing of Lucent Series II cell sites.
- AC1019 – EasySweep is a swept measurement utility designed to test antennas and transmission lines.
- AC1050/1051 – AutoCell NT and AutoCell NTD provides automated testing of Northern Telecom cell sites including the TRU-3 PCS band radios.
- AC1027 – AutoCell 884 is a test package for the Ericsson 884 base station and includes routines for testing the RTFL.

### Hands on Training Courses Make the 1900 BSA a Sound Business Investment

Maximizing your investment is important and Aeroflex provides after the sale support with specialized TIA/EIA-136 training including:

- TIA/EIA-136 Systems Introduction
- TIA/EIA-136 Standards
- TIA/EIA-136 Base Site Test Suite Operation

Fully configurable to meet your training needs, Aeroflex allows you to custom design training to enhance your employee's technical capabilities.

### Complex Functionality Made Easy and Affordable

Even with its elaborate capabilities, the Aeroflex-1900 BSA was developed to execute complex tests simply and with minimal operator training.

Using field-proven front panel and user man-machine interfaces, the 1900 BSA gives you the performance and ease-of-use features that significantly reduce your testing and training time.

A new color display gives the 1900 BSA user vivid screen clarity.

Extensive use of softkeys reduces your complex cellular and PCS parametric and protocol tests to fast, simple and manageable routines.

Priced affordably, the 1900 BSA is designed to test your base sites, not your pocketbook.

## SPECIFICATION

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### RF SIGNAL GENERATOR

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#### (T/R) and Duplex Connector

##### Frequency Range

10 MHz to 2010 MHz

##### Resolution

100 Hz

##### Accuracy

Same as Master Oscillator

##### Range

##### T/R

-127 to -10 dBm into 50 $\Omega$

(-30 dBm maximum with reverse power present)

##### Duplex

-110 to -5 dBm into 50 $\Omega$

+10 dBm (CW Only)

##### Resolution

0.1 dB

##### Accuracy

$\pm 1.5$  dB

##### Duplex Connector Input Protection

Alarm sounds when level exceeds threshold level, m

### MODULATION

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#### Internal FM

##### Range

$\pm 100$  Hz to  $\pm 100$  kHz Dev.

##### Accuracy

(1 kHz to 20 kHz dev., 1 kHz rate)

$\pm 5\%$ ,  $\pm$ Residual,  $\pm$ LSD

(>20 kHz dev.)

$\pm 10\%$ ,  $\pm$ Residual,  $\pm$ LSD

##### Deviation Resolution

100 Hz

##### Internal Phase/Quadrature (IQ)

##### RF Ranges

10 MHz to 2010 MHz

##### IQ Error Vector Magnitude

6% from Ideal DQPSK Waveform

(TIA/EIA-136) – Base Station

8% from Ideal DQPSK Waveform

(TIA/EIA-136) – Mobile Station

##### IQ Origin Offset

<-28 dBc

##### External

External inputs with the same characteristics as internal sources are supported. 10 Vp-p input level required to obtain indicated setting  $\pm 10\%$ .

### AF SIGNAL GENERATOR

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#### AF Generators #1 and #2

##### Frequency Range

10 Hz to 40 kHz

##### Frequency Resolution

0.1 Hz <2 kHz

1 Hz >2 kHz

##### Frequency Accuracy

$\pm 0.1\%$

##### Level

1 mV to 3 VRMS (600  $\Omega$ )

##### Level Resolution

0.1 mV (level <200 mV)

0.7 mV (level >200 mV)

##### Level Accuracy

$\pm 3\%$ ,  $\pm$ LSD (frequency <10 kHz)

##### Waveshape

Sinewave, Square, Triangle, Ramp, Pulse

### AUDIO FREQUENCY COUNTER

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##### Frequency Range

10 Hz to 200 kHz (in 4 decade ranges)

##### Accuracy

Same as Master Oscillator  $\pm$ LSD

##### Resolution

0.1 Hz (10 Hz to 2 kHz)

1 Hz (2 kHz to 20 kHz)

10 Hz (>20 kHz)

##### Input Waveform

Sine or Square

##### External Level

0.5 to 15 VRMS

(SINAD/BER input – 1 M $\Omega$  impedance)

.1 to 3.5 VRMS

(EXT MOD input – 100 k $\Omega$  impedance)

## **RF POWR (T/R INPUT)**

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### **Frequency Range**

100 MHz to 2010 MHz

### **Level Input Range**

0.05 mW to 50 W RMS

(-13 dBm to +47 dBm, 1,2,5 sequence, 4 decade)

### **Resolution**

1%

### **Accuracy**

±6% (>5 W and <50 W, at 20° to 30°C)

## **LOW LEVEL RF POWER METER**

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(Antenna In Connector Only)

### **Frequency Range**

100 MHz to 2010 MHz

### **Level Input Range**

0.1 mW to 100 mW RMS

(-40 dBm to -10 dBm: 1,2,5 sequence, 3 decade)

Useable down to .001 mW RMS (-60 dBm)

### **Resolution**

1% minimum

### **Accuracy**

±25% (0.1 to 100 mW RMS at 20° to 30°C)

## **RF POWER METER ADJACENT CHANNEL POWER MEASUREMENT**

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### **Frequency Range**

100 MHz to 2010 MHz

### **Level Input Range (T/R Port)**

317 mW to 50W RMS (+25 dBm to +47 dBm)

### **Level Input Range (Ant. Port)**

0.3 mW to 1 mW RMS (-35 dBm to 0 dBm)

### **Resolution**

.1 dB minimum

### **Accuracy**

±2 dB relative

## **RECEIVER**

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### **Frequency Range**

10 MHz to 2010 MHz

### **Input Level Range (T/R Port)**

-30 dBm to +47 dBm

### **Input Level Range (Ant. Port)**

To 0 dBm

### **Sensistivity**

< -80 for 10 dB SINAD

(1 kHz rate, 6 kHz Dev, FM 2, ANT Input Port)

## **Demodulation Output Level**

(FM): 5 Vp-p ±15% (at full scale into 600 Ω)

(PM): 40 mVrms ±15% (5 Rad, into 600 Ω)

(AM): 1 Vrms ±15% (80% modulation, into 600 Ω)

(SSB): 1.15 Vrms ±15% (Beat tone, into 600 Ω)

## **RF FREQUENCY METER**

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### **Frequency Range**

10 MHz to 2010 MHz

### **Accuracy**

Same as Master Oscillator ±LSD

### **Resolution**

1 Hz (fc < 20 MHz)

10 Hz (fc >20 MHz)

### **Minimum Level**

-60 dBm (ANT connector)

## **RF FREQUENCY ERROR METER**

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### **Frequency Range**

10 MHz to 2010 MHz

### **Frequency Counter Meter Range**

0 Hz to ±150 kHz

### **Bar Graph Meter Range**

0 to ±100 kHz (in 4 decade ranges)

### **Accuracy**

Same as Master Oscillator ±LSD

### **Resolution**

1 Hz (1 Hz to 10 kHz)

10 Hz (>10 kHz)

### **Minimum Level**

-60 dBm (ANT Input Port)

0 dBm (T/R Input Port)

## **FM DEVIATION METER**

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### **Frequency Range**

10 MHz to 2010 MHz

### **Deviation Range**

±100 Hz to ±100 kHz

### **Resolution**

100 Hz (< 20 kHz ranges)

1 kHz (>20 kHz ranges)

### **Accuracy**

±5% ±2 counts + source residual FM

(300 kHz IF, <15 kHz rate)

### **Minimum Level**

-60 dBm (ANT Input Port)

0 dBm (T/R Input Port)

## PM DEVIATION METER

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### Frequency Range

10 MHz to 2010 MHz

### Modulation Range

0 Rad to 10 Rad (Peak)

### Resolution

0.01 Rad (< 5 Rad)

0.1 Rad (> 5 Rad)

### Minimum Level

-60 dBm (ANT Input Port)

0 dBm (T/R Input Port)

## AM MODULATION METER

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### Frequency Range

10 MHz to 2010 MHz

### Modulation Range

1% to 90%

### Resolution

1%

### Accuracy

$\pm 5\%$  of full scale  $\pm 1$  count + source residual AM

### Minimum Level

-60 dBm (ANT Input Port)

0 dBm (T/R Input Port)

## DISTORTION METER

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### Distortion Range

0% to 20%

### Resolution

0.1%

### Accuracy

$\pm 0.5\%$  distortion  $\pm 1$  count (1% to 10%)

$\pm 2\%$  distortion  $\pm 1$  count (>1% to 20%)

### Signal Frequency

1 kHz

### Signal Level

0.1 Vrms to 10 Vrms (SINAD/BER input)

## ERROR VECTOR MAGNITUDE (EVM) METER

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### (Antenna Port)

### Input Range

NT 400 Channels

Cellular 800 MHz Channels

PCS 1900 MHz Channels

### Minimum Carrier Level

-40 dBm

### EVM Range

0 to 100%

### EVM Resolution

0.01%

### Meter Residual EVM

<2% indication

### Accuracy:

$\pm 3.0\%$  indication,  $\pm 1$  LSD + meter residual EVM

## SINAD METER

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### Range

3 dB to 40 dB

### Resolution

0.1 dB

### Accuracy

$\pm 2$  dB  $\pm 1$  count

### Signal Frequency

1 kHz

### Signal Level

0.1 Vrms to 10 Vrms (SINAD/BER input)

## DIGITAL MULTIMETER

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### Voltmeter (DC/AC)

### Ranges

200 mV, 2V, 20V and 200 V

### Input Impedance

1 M $\Omega$  ( $\pm 10\%$ )

150  $\Omega$  ( $\pm 5\%$ )

600  $\Omega$  ( $\pm 5\%$ )

### Maximum Input (AC)

150  $\Omega$  20 V RMS

600  $\Omega$  30 V RMS

1 M $\Omega$  30 V RMS

### Frequency

DC, 50 Hz to 20 kHz

### Resolution

3.5 digit

### Accuracy

$\pm 5\%$ , full scale,  $\pm 1$  count

(AC, where  $ACV \cdot kHz < 140$ )

$\pm 1\%$  of full scale  $\pm 1$  count (DC)

### Ohmmeter

### Ranges

200  $\Omega$  to 20M $\Omega$  (full scale, decade sequence)

### Resolution

3.5 digit

**Accuracy**

±5%, full scale, ±1 count, whichever is greater

**Current Meter (AC/DC)**

**Ranges**

20 mA to 2 A

**Resolution**

3.5 digit

**Accuracy**

±5%, full scale, ±1 count, or 0.1 mA, whichever is greater

**OSCILLOSCOPE**

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**Vertical BW**

1 MHz (-3 dB)

**Input Ranges**

1 mV / Div to 50 V / Div

(1-2-5 sequence, 8 divisions)

**Max Input**

30 V RMS

**Accuracy**

±5% of full scale

±10% of full scale (1 mV and 2 mV ranges)

**Resolution**

Full Scale / 256

**Coupling**

AC, DC, GND

**Horizontal Sweep Rate**

1 µSec / Div to 100 mSec / Div

(1-2-5 sequence, 10 divisions)

**Accuracy**

±1% of full scale

**Resolution**

Full scale / 400

**SPECTRUM ANALYZER**

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**Range**

50 MHz to 2010 MHz

**Frequency Span**

**Range**

1 kHz/Div to 200 MHz / Div plus Zero Scan

(1-2-5 sequence)

**Accuracy**

±5% of Span Width

**Vertical**

**Scales**

Log 10 dB / div.

Log 2 dB / div.

**Resolution**

Full Scale / 256

**Displayed Range (Dynamic)**

60 dB (0 dB Attenuation, Span <1 MHz / Div)

**Bandwidth Switching Error**

<2 dB (5 kHz / Div thru 1 MHz / Div)

<3 dB (<5 kHz / Div or >1 MHz / Div)

**Overall Accuracy**

±4 dB (50 MHz to 400 MHz) (normalized)

±5 dB (>400 MHz to 2010 MHz) (normalized)

±2 dB Log Linearity

**Input Attenuator**

LNA, 0dB to 30 dB in 5 dB steps

(User selectable, ANT Input Port)

40 dB to 70 dB in 5 dB steps

(User selectable, Power < 2W, T/R Port)

60 dB to 90 dB in 5 dB steps

(User selectable, Power >2W, T/R Port)

**BIT ERROR METER**

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**Range**

1x10<sup>-1</sup> to 1x10<sup>-5</sup>

**Data Rates**

75, 150, 300, 600, 1200, 2400, 4800 BPS & 16 kbps

**Data Pattern Size**

100 to 100,000 bits

**Data Pattern Type**

Random, Fixed & User Defined

**INPUT/OUTPUT (I/O)**

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**RS-232**

Serial Port for Aeroflex Application Program Support

**External Video Port Operation Mode**

VGA Compliant

**Frequency Reference Ports**

BNC Input for External 10 MHz Sync

BNC Output of Internal 10 MHz Sync

**IQ Output Interface**

BNC Connector

**MASTER OSCILLATOR**

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**TDMA Timeslot Sync**

BNC Connector

**Frequency Standard**

10 MHz (Nominal)



**Temp Stability**

±0.1 PPM (0° to 50°C)

**GENERAL CHARACTERISTICS**

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**Dimensions**

7.4 in Height, 18.8 in Width, 25 in Depth  
(with bail handle and front panel cover in place)

**Weight**

Less than 48 lbs.

**POWER REQUIREMENTS**

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**Operating Temperature Range**

0° to 50°C

**Line**

100 – 120VAC, 60 Hz  
220 – 240VAC, 50 Hz

**Maximum Input Power**

210W

**DISPLAY**

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**Type**

Color, Active Matrix LCD

**Size**

9.6 cm (3.8 in) wide, 8.6 cm (3.4 in) high

**Resolution**

640 pixel x 480 pixels.

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**VERSIONS AND ACCESSORIES**

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When ordering please quote the full ordering number information.

**Ordering Numbers****Options****Cable Connector Kits**

AC1060	Ericsson Autocell Cable Kit
AC1061	Nortel Autocell Cable Kit
AC1062	Lucent Autocell Cable Kit

**AutoCell Automated Software**

AC1017	Autocell – Lucent Series II, PCS Minicell
AC1027	Autocell – Ericsson 882/884
AC1050	Autocell – Nortel TRU3 & P Series

**Enhanced Software Tools**

AC1009W	EasySpan for Windows
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AC1011	EasySpan
AC1019	EasySweep
AC1021	CellScan

**Accessories**

AC7854	Wheeled Transport Case
AC1201	Telescoping Antenna
AC4103	Return Loss Bridge Kit (5 MHz – 2 GHz) Includes AC1019
AC8645	Microphone
AC9153	Carrying Case

**Service Contracts**

AC2571	1 year extended – 3 years total AC2572 1 year extended – with Cert. Cal.
AC2573	3 year extended – 5 years total AC2574 3 year extended – with Cert. Cal.

**Metrology**

We offer our customers a complete calibration check service on their instruments. Standards used in our Metrology Lab are NIST traceable. Aeroflex is a member of the National Conference of Standards Laboratories.

**Warranty**

Aeroflex Base Site Analyzers are covered by a limited two-year warranty against defective parts and workmanship.

The continuous improvement of its products is the intent of Aeroflex Systems, Inc. Who reserves the right to make design changes without notice.

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Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

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