The Advanced Test Set (ATS) is a family of communications test systems that provide the ability to support all levels of performance verification, manual/automated testing, as well as fault isolation & repair from the Organizational Level through Intermediate Levels and on into the Depots (4th line). Synthetic metering functions are available including RF Power, RF Frequency, Channel Rejection and Selectivity.

## ATS-2000A Overview

The ATS-2000A is an automated, bench-top member of DME’s next-generation ATACTS Family of Advanced Tactical Agile Communications Test Solutions. The unique Software-Defined capabilities exclusively available in the ATS-2000A provide both the Military and Commercial Wireless user/maintainer community with the first really affordable test solution destined to be the defining “standard” in “Automated” Synthetic Testing. The ATS-2000A is a Pentium IV Processor based, digitally synthesized test platform that combines the capabilities of many different stand-alone Test and Measurement Instruments into a single, ruggedized, compact unit.

The ATS-2000A utilizes an alphanumeric keypad, dedicated function keys and multi-task software keys combined with a high-resolution 1024 x 768 pixel color LCD-TFT display to enter, edit and display instrumentation test functions (stimulus/measurement) and test data (results). An Embedded Windows based multi-tasking Operation System and Advanced Graphical User Interface (GUI) allows the Engineer or Test/Field Technician to measure, compare and contrast the results of various test scenarios and recall various parameters associated with each of the testing modes to easily fault isolate (to the SRU) various communications LRUs such as; Radios, Antennas, Couplers, Pre/Post Selectors, RF Power Amplifiers, Remote Controls, Handsets, Headsets, Loud Speakers and System Interconnects. In addition, mass storage capability allows storage and recall of test results, waveforms and analysis information for comparison, as well as operational instrumentation mode setup parameters and individual test criteria from all measurement and metering devices.

The ATS-2000A is capable of generating, receiving and monitoring many wireless standards. The Digitally Synthesized RF Receiver and RF Generator coupled with the RF Front-End’s advanced switching, power level handling and monitoring, supports both narrow-band and wide-band voice/data in single channel (SC), and spread spectrum (FHSS/DSSS) modes. An extremely flexible digital agile RF Upconverter and Downconverter system is fully capable of supporting the most advanced fast hopping waveforms.

The ATS-2000A is capable of generating, receiving and metering NB/WB analog signals (AM, FM, CW, USB, LSB), digital signals (ASK, FSK, PSK, GFSK, BPSK, DPSK, MSK, GMSK, QBL/MSK or quadrature signals (QAM, C4FM, QPSK, 8PSK, 16QAM or 64QAM) from 250 kHz to 2000 MHz. User configurable, synthetic metering functions are available including RF Power, RF Frequency, RF Frequency Error, RF Receive Signal Strength Indication (RSSI), FM Deviation, AM Modulation, SINAD/Distortion, AF Frequency, Digital Multi-Meter (DMM), Dual Channel Oscilloscope, RF Spectrum Analyzer (opt.), Tracking Generator (opt.), VSWR Meter & Cable Fault Analyzer (opt.), Bit Error Rate (opt), Error Vector Magnitude (opt), Constellation Display (opt) and Dynamics Signal Analyzer (opt.). Extensive use of Field Programmable Gate Arrays (FPGA’s), Digital Signal Processors (DSP’s) and Software Defined Radio (SDR) technology, along with Direct Digital Synthesis (DDS), gives the ATS-2000A complete control of frequency, amplitude and phase, making it possible to support any current or future waveform modulation type. This same unique architecture makes it possible to support new capabilities via a simple software update without the need for returning the unit to the Depot or Manufacturer. Future hardware options such as a second out-of-band tunable, low phase-noise signal source are currently planned to support Out-Of-Band Receiver, IMD, Adjacent Channel Rejection and Selectivity.

## ATS-2000A Capabilities

The ATS-2000A provides coverage of the entire 250 kHz to 2000 MHz frequency band as allocated for the military’s new Joint Tactical Radio System (JTRS) and many of today’s new commercial 3G/4G wireless standards. The Digitally Synthesized RF Receiver and RF Generator coupled with the RF Front-End’s advanced switching, power level handling and monitoring, supports both narrow-band and wide-band voice/data in single channel (SC), and spread spectrum (FHSS/DSSS) modes. An extremely flexible digital agile RF Upconverter and Downconverter system is fully capable of supporting the most advanced fast hopping waveforms.

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The ATS-2000A test set provides unprecedented Interface capability to support all legacy and emerging wireless communication systems. In its "Automated" configuration, the user has complete control of the signal routing and interface characteristics for proper connection to any interface port on the Unit Under Test (UUT). Through selectable signal loading, impedance characteristics and level control, the ATS-2000A is able to interface directly to the UUT without the need for external interface translation circuitry. To date, this level of fully programmable and configurable interface capability has not been available in any other portable "all-in-one" test set platform on the market.

Automated Test Extensions

For Automated Test Applications, the ATS-2000A offers optionally embedded UUT Interface Modules in the form of a UUT-ID (EIM) and UUT-COM (CIM) module resulting in ATE expandability without the need to increase size and complexity. This integrated automated test capability is supported by our TestEZ TPS development tool-set resulting in a LabView/Lab Windows environment that is familiar to our customers and allows TPS development for LRUs/SRUs in a fraction of the time required from the older, proprietary systems.

The ATS-2000A configuration offers automated test extensions in the form of a 1U "add-on" LRU Power Supply Adapter (PSA-2000) and a separate SRU Module Test Extension (MTE-2000).

The PSA-2000 may be operated under manual or TPS control and provides up to four independently controllable power sources with configurable/programmable capability to provide over 20 amps to the Unit Under Test (UUT).

The MTE-2000 provides complete Depot support for RF, Analog and Digital CCA’s (modules), Utilizing Optical Inspection & Analysis (OIA), Signature Analysis (SA), Path Testing (Connectivity), Digital Functional Stimulus/Response (DFSR), In-Circuit Test (ICT), and Functional Parametric Testing (Synthetic Instrumentation) the MTE is able to provide various levels of cost effective test capability providing fault isolation & repair to the component.

Test Application Software

The ATS-2000A is designed to allow full use of DME’s TestEZ suite of TPS development tools. TestEZ provides all the software needed for complete, efficient, user-friendly, test application development & diagnostic maintenance.

Additional support tools are provided for picture probing (Probe Assist), archive management (Archive Manager) and test results documentation (Doc Assist).
In addition to automatic testing, the Stand-Alone Instrumentation Mode and Test EZ drivers operate in a manual mode allowing the user GUI access to all ATS-2000A Synthetic Instrumentation assets. Test EZ is quickly configured to any ATACTS Platform through an easy to use, one-time, setup program and presents a GUI “point & click” interface to the user so no coding experience in any software language is required to operate or code with the TestEZ software suite.

**ATS-2000A Synthetic Instrumentation**

The ATS-2000A includes a RF Generator, RF Receiver, Dual AF Waveform Generators, RF Spectrum Analyzer, Swept Frequency Analyzer, Cable Fault/Distance-to-Fault Analyzer, Dynamic Signal Analyzer and Bit Error Rate Meter capable of monitoring internal and external signals from 30 Hz to 2000 MHz. The ATS-2000A provides independent operation of all meters for use as test instruments as well as synthesizing them into the major mode functions. As independent instruments, the meters provide a bar graph display and digital data readout.

**Data Entry and Display**

All data received by the operator is in the form of screens and menus. Each major instrumentation mode has a dedicated operation screen and user selectable meter list with subordinate setup menus. The host processor updates operation mode screens to reflect changes in parameters imposed by the operator or to reflect changes in data received from or delivered to the Unit Under Test (UUT).

All major instrumentation operation mode and individual meters have additional subordinate setup and control menus for functions not available on the operation mode screen. Functions such as signal routings to the front panel connectors, AGC control, user defined IF and Post Detector Filter bandwidth settings and signal formats are configured via expanded menus.

**RF Signal Generator**

The Digitally Synthesized RF Generator in the ATS-2000A is capable of generating modulated or unmodulated carrier signals from 250 kHz to 2000 MHz (in 1 Hz steps).

**Digitally Synthesized RF Receiver**

The Digitally Synthesized RF Receiver in the ATS-2000A is capable of receiving modulated and unmodulated signals from 250 kHz to 2000 MHz (in 1 Hz steps).

**RF Signal Receiver**

The RF output level is variable from -137 dBm to +10 dBm. Modulation types capable of being supported include analog signals (AM, FM, CW, USB, LSB), digital signals (ASK, FSK, PSK, GFSK, BPSK, DPSK, MSK, GMSK, QBL/MSK) or quadrature signals (QAM, C4FM, QPSK, 8PSK, π/4QPSK, π/4DQPSK).

Configurable synthetic measurement and metering capabilities available in the RF Receiver Mode including RF Power, RF Frequency, RF Frequency Error, FM Deviation, AM Modulation, EVM, SINAD, Distortion, AF Frequency, Receive Signal Strength Indication (RSSI), and Constellation. The Spectrum Analyzer, Dynamic Signal Analyzer, and Scope are also available for use on the RF Receiver Operation Mode Screen. Low-level signals are accessed through the Duplex Port and high-powered signals through the T/R connector.

**Duplex**

The ATS-2000A provides the capability to combine the operation of the independent RF Generator and RF Receiver from 250 kHz to 2000 MHz for Duplex operation. The operator has three on screen monitoring options, the transmitter under test, receiver under test or both in parallel. All features available with the RF Generator and RF Receiver are available in Duplex Mode.
**Dual AF Generator**

The ATS-2000A includes Dual Arbitrary Function Generators. These Audio Function Generators are configurable as Audio Sources routed to the Front Panel or to the UUT-ID Module.

**Digitally Synthesized AF Generator**

All METERS (Synthetic Instruments) are available when displayed on the Function Generator screen.

**Dual Oscilloscope**

The ATS-2000A includes a Dual Channel 20 MHz Oscilloscope or an optional 250 MHz (2.5Gsps) Oscilloscope.

**RF Spectrum Analyzer**

The RF Spectrum Analyzer monitors both internal and external signals from 250 kHz to 2000 MHz.

**Digital AF Generator**

All METERS (Synthetic Instruments) are available when displayed on the Function Generator screen.

**Dual Channel Oscilloscope**

The Oscilloscope allows input from 1 mV to 50 V per division with a maximum input voltage of 200 Vdc. Sweep rates range from 5 ns/div to 1 s/div (200 MHz Opt). Stored traces may be recalled and displayed simultaneously with live traces, providing the operator the opportunity to compare the traces. Routed sources including the CH1, CH2, Receiver IF, Demodulated Audio, Audio Generators, and External Audio/Baseband. The Oscilloscope is available for stand-alone operation or in combination with all major Instrumentation Operation Modes.

**RF Spectrum Analyzer**

Scan widths range from 1 kHz to 200 MHz as well as zero scan. Available log scales are 2 and 10 dB/div with amplitude scale units of dBm, dBmV, dBV, dBmW and dBW. Memory functions for the Spectrum Analyzer include trace store, recall, compare and peak hold. External low-level signals can be displayed "off-the-air" through the Duplex connector or applied through the higher power T/R connector. The Spectrum Analyzer also functions as a tracking generator with a variable level from -80 to +10 dBm. The Spectrum Analyzer is available for display alone or in all major operation modes.

**Bit Error Rate Meter**

The ATS-2000A provides an independent Bit Error Rate Meter capable of measuring bit error rates and injecting simulated errors in Software-Defined Waveforms. Data stream programmable characteristics such as mode, pattern, rate and modulation are available various Synchronous/Asynchronous applications.

**Meters**

The ATS-2000A provides independent operation of the meters for use as synthetic test instruments as well as synthesizing them into the major mode functions.
ATS-2000A Specifications

GENERAL NOTES

Warm-up time is 10 minutes for the following performance requirements.
RF measurements are referenced to 50 OHMS.
Where specified resolution exceeds specified accuracy, specified resolution takes precedence.

RF SIGNAL GENERATOR

RF SIGNAL GENERATOR - T/R and Duplex Connector

Frequency:
Range: 250.0 kHz to 2000 MHz
Resolution: 1 Hz
Accuracy: See Reference Oscillator

Level:
T/R Port Range: -137 dBm to 0 dBm
T/R Impedance: 50 Ω
VSWR/Return Loss: 1.25:1 (Return Loss > 16 dB)
T/R Input Protection: 200 Watts for 15 Sec. (With Alarm)

Duplex Port Range: -127 dBm to +10 dBm
Duplex Impedance: 50 Ω
VSWR/Return Loss: 1.25:1 (Return Loss > 16 dB)
Duplex Input Protection: 10 Watts for 15 Sec. (With Alarm)

Spectral Purity:
Residual FM: < 0.5 Hz RMS (Post Detection BW: 3 kHz)
Residual AM: < 0.02% RMS (Post Detection BW: 15 kHz)
Phase Noise: < 0.1 dBc/Hz at 20 kHz from carrier or 1500 MHz
Harmonics: < -30 dBc (Typical)
Non-Harmonics: < -50 dBc (Typical)

RF SIGNAL MODULATION - T/R and Duplex Connector

Internal/External FM Modulation: (External Optional)
Frequency Range: 1 MHz to 2000 MHz
Deviation Range: 100 Hz to ±100 kHz (Operation to ±2 kHz)
Accuracy: ± 5% of setting or ±1 kHz where ±10 kHz deviation
Resolution: 1 Hz
Deviation Rate: 10 Hz to 40.0 kHz, up to 300 kbps Digital
Wave Forms: Sine, Square and Pulse (Arbitrary)
THD: < 1.0%

Internal/External AM (Includes LSB/USB) Modulation: (External Optional)
Frequency Range: 1 MHz to 2000 MHz
Modulation Rate: 10 Hz to 40.0 kHz, up to 300 kbps Digital
Wave Forms: Sine, Square and Pulse (Arbitrary)
THD: < 1.0% (30% to 90% modulation)

Internal/External Phase Modulation: (Optional)
Frequency Range: 1 MHz to 2000 MHz
Modulation Rate: 0 Radians to 10 Radians
Accuracy: ± 5% of setting (10% to 90% modulation)
Resolution: 0.1 Radians
Wave Forms: Sine, Square and Pulse (Arbitrary)
THD: < 1.0%

Internal/External Digital Modulation: (Optional)
Digital: ASK, FSK, PSK, GFSK, BPSK, DPSK, MSK, QAM, C4FM, 8PSK, 16QAM, etc.
Modes: FDMA, TDMA, CDMA and others

FREQUENCY AGILITY (For both RF Generator & Receiver)

Setting Time: < 200 μs for bandwidths up to 100 MHz (1 MHz to 2000 MHz)
(Measured at 1 kHz of desired frequency)

RF SIGNAL RECEIVER

Frequency:
Range: 250.0 kHz to 2000 MHz
Resolution: 1 Hz
Accuracy: See Reference Oscillator

T/R Input Level Range:
-70 to +53 dBm Input
< -70 mV (<10 dBm) for 10.0 dB SINAD, 30 kHz IF Bandwidth

T/R Impedance:
50 Ω
VSWR: 1.25:1 max.
Overload Protection: ≥ +53 dBm (Relay Protected & Audible/visual Alarm)

Duplex Input Level Range:
-110 to +10 dBm Input (-80 dBm for meter accuracy)
< 2 µV (-101 dBm) for 10.0 dB SINAD, 30 kHz IF Bandwidth

ANT Impedance:
50 Ω
VSWR: 1.25:1 max.
Overload Protection: ≥ +40 dBm (Relay Protected & Audible/visual Alarm)

IF Bandwidths:
30 kHz, 300 kHz, 2 MHz and 5 MHz
Audio Filters:
300 Hz LP, 30 Hz HP, 15 kHz LP, 300 Hz - 3 kHz HP. None
3 kHz LP, 5 kHz LP, 8.33 kHz LP, C-MSK, BP, CCITT BP (Opt)

Standard Waveforms:
Analog: AM, FM, USB, LSB, CW
Optional Waveforms:
Digital: ASK, FSK, PSK, GFSK, BPSK, DPSK, MSK, QAM, C4FM, 8PSK, 16QAM, etc.
Modes: FDMA, TDMA, CDMA and others

Spectral Purity:
Residual Distortion: < 0.5% + FM Residual
Phase Noise: < -85 dBc/Hz at 20kHz offset from carrier
IMD: < -85 dBc for two tones separated by 2MHz, RF=10MHz,
Noise Power Ratio: < -50 dB for Received signal bandwidth of 4 MHz,
and notch width of 0.5 MHz, for settings where nominal
noise floor is 60dB below signal level during test.

Selectivity:
Receive IF Bandwidth:
Wide-band 5000 kHz ± 750 kHz, 12:1 40dB shape factor
Digitally corrected amplitude and
group delay variation to 20 kHz BW
Medium-band 300 kHz ± 50 kHz, 12:1 40dB shape factor
Digitally corrected amplitude and
group delay variation to 220 kHz BW, RF=2 MHz
Narrow-band 30 kHz ± 5 kHz, 12:1 40dB shape factor
Digitally corrected amplitude and
group delay variation to 22 kHz BW

Adj. Channel Rejection: Software Defined Waveform Dependent
SSB: SSB Demodulator, selectable for lower and upper sideband,
with selectable Offset from 10 Hz to 3 kHz from suppressed carrier
for signal channel voice/data testing.

AF GENERATOR (AFGEN #1 and AFGEN #2, software dependent)

Frequency:
Range: 10 Hz to 40.0 kHz
Resolution: ± 0.1 Hz
Accuracy: ± 0.1 %

Level:
Baseband Port Range: 0.35 mVrms to 3.5 Vrms (Typical)
Audio Port Range: 90 mVrms to 7 Vrms (Typical)

Output Impedance: 8 Ω (Nominal, Balanced)
(50 kΩ (Nominal, Unbalanced)
Resolution: 0.1 mVrms (0.35 mVrms - 200 mVrms)
10.0 mVrms (>200 mVrms)
Accuracy: < 5.0% @ >10mVrms, 1 kHz Sine, for 150 Ω & 600 Ω load

Spectral Purity:
THD: < 1.0% @ >10mVrms, 100 Hz to 20 kHz
Wave Forms: Sine, Square, Triangle, Ramp Up, Ramp Down, Pulse (Arbitrary)
### FM DEVIATION METER
- **Carrier Level:** See T/R and DUPLEX connector specification
- **Input Level:** 0.1 mV to 200.0 W
- **Resolution:** 0.01 dB or 0.1 mV
- **Accuracy:** ± 10% (< ± 5% typical)
- **Return Loss:** > 18.0 dB
- **Display Readings:** Volts, Watts and dBm

### RF FREQUENCY COUNTER & FREQUENCY ERROR METER
- **Accuracy:** ± 1 dB max.
- **Accuracy:** ± 3 feet max.
- **Resolution:** 400 points min. full screen
- **Display Format:** Return Loss/VSWR (dB, vert.) vs. DTF (feet, horiz.)
- **Test Range:** 3 feet (1 Meter) to 328 feet (100 Meters)
- **Distance to Fault (Cable Fault):** (Optional)
  - 15.0 Sec On, 1.0 Minute OFF at 100 - 200 Watts
- **Scale:** 8 divisions, 2 dB/div., 5 dB/div., 10 dB/div.

### RF FREQUENCY COUNTER & FREQUENCY ERROR METER

#### Radio Frequency Counter:
- **Range:** 250 kHz thru 2000 MHz
- **Capture Bandwidth:** ± 2.5 MHz (with 5 MHz wideband IF filter)
- **Accuracy:** See Reference Oscillator

#### Radio Frequency Error:
- **Range:** ± 0 Hz to ± 2500 kHz (with 5 MHz IF)
- **Accuracy:** See Reference Oscillator

### FM DEVIATION METER
- **Range:** ± 100 Hz to ± 100 kHz
- **Accuracy:** ± 5.0% + source residual
- **Resolution:** 1 Hz
- **Modulation Rate:** 100 Hz to 40 kHz

### AM MODULATION METER
- **Range:** ± 1% to ± 95% (Operation to 100%)
- **Accuracy:** ± 2.0% + source residual from 30% to 90%
- **Resolution:** 1%
- **Modulation Rate:** 100 Hz to 40 kHz

### PM DEVIATION METER
- **Range:** 0 to 10 Radians (Peak)
- **Accuracy:** ± 1.0% + source residual
- **Resolution:** 0.01 Radians
- **Modulation Rate:** 100 Hz to 40 kHz

### ERROR VECTOR MODULATION METER
- **Range:** 0 to 100%
- **Accuracy:** ± 3.0% + source residual
- **Resolution:** 0.01%
- **Residual EVM:** < 2%
- **Modulation Rate:** 100 Hz to 40 kHz

### DISTORTION METER (THD and THD+NNoise)
- **Range:** 0.1 % to 50.0%
- **Accuracy:** ± 0.5%
- **Resolution:** 0.1%
- **Signal Frequency:** 100 Hz to 10 kHz
- **Signal Level:** See BASEBAND and AUDIO INPUT connector specification

### SINAD METER
- **Range:** 3.0 dB to 40.0 dB
- **Accuracy:** ± 1.0 dB
- **Resolution:** ± 0.1 dB
- **Signal Frequency:** 100 Hz to 10 kHz
- **Signal Level:** See BASEBAND and AUDIO INPUT connector specification

### AUDIO FREQUENCY COUNTER
- **Range:** 10 Hz to 10 kHz (In 4 decade ranges)
- **Accuracy:** See Reference Oscillator
- **Resolution:** 0.1 Hz
- **Input Waveform:** Sine or Square Wave

### 3½ Digit DIGITAL MULTIMETER (Standard)
- **Ranges:**
  - DC: 0.01 mA to 300 mA
  - AC: 0.01 mA to 300 mA
- **Accuracy:**
  - DC: ± 0.1% full scale (Typical)
  - AC: ± 0.5% full scale (Typical AC)

### 6½ Digit DIGITAL MULTIMETER
- **Ranges:**
  - DC: 0.1 mA to 300 mA
  - AC: 0.1 mA to 300 mA
- **Accuracy:**
  - DC: ± 0.01% full scale (Typical)
  - AC: ± 0.5% full scale (Typical AC)

### 20 MHz Dual Channel OSCILLOSCOPE (Standard)
- **Vertical Input:** 2 Channels
- **Single Shot Rate:** 100 MS/sec
- **Vertical Bandwidth:** 20 MHz (-3 dB)
- **Bandwidth Limiters:** None
- **Frequency Range:** DC to 20 MHz
- **Vert. Input Ranges:** 2 mV/Div to 50 V/Div
- **Max Input Voltage:** 200 V
- **Vertical Accuracy:** ± 5% of full scale
- **Digitizer Resolution:** 8 bits
- **Coupling:** DC, AC, and GND
- **Horizontal Sweep Rate:** 100 nsec/Div to 1 Sec/Div
- **Timebase Accuracy:** ± 2 ppm
- **Input Impedance:** 1 MΩ shunted by 27 pF or 50 Ω (Nominal)

### 200 MHz Dual Channel OSCILLOSCOPE (Optional)
- **Vertical Input:** 2 Channels
- **Single Shot Rate:** 2.5 GS/sec
- **Vertical Bandwidth:** 200 MHz (-3 dB)
- **Bandwidth Limiters:** None
- **Frequency Range:** DC to 20 MHz
- **Vert. Input Ranges:** 1 mV/Div to 50 V/Div
- **Max Input Voltage:** 200 V
- **Vertical Accuracy:** ± 2.5% of full scale
- **Digitizer Resolution:** 8 bits
- **Coupling:** DC, AC, and GND
- **Horizontal Sweep Rate:** 10 nsec/Div to 1 Sec/Div
- **Timebase Accuracy:** ± 2 ppm
- **Input Impedance:** 1 MΩ shunted by 27 pF or 50 Ω (Nominal)
### RF Spectrum Analyzer (Optional)

- **RF Range**: 250 kHz to 2000 MHz
- **Frequency Span**: 1 kHz/Div to 200 MHz/Div, plus zero span
- **Accuracy**: 1%, limited by display resolution and RBW
- **Timebase Accuracy**: See Reference Oscillator
- **Level**:
  - Vertical: Log, 10 dB/Div and 2 dB/Div
  - Vertical Resolution: 0.2 dB (2 dB/Div)
- **Overall Accuracy**: ± 2 dB
- **Distortion**: -60 dBc for two tones at “Sensitivity Level”
  - Phase Noise: -90 dBc at 20 kHz offset (RBW = 1 Hz to 1 kHz)
  - <100 dBc at 200 kHz offset (RBW > 1 kHz to 10 kHz)
- **Attenuator**: Scalable in 10 dB steps

### Dynamic (AF) Signal Analyzer (Optional)

- **AF Range**: 30 Hz to 250 kHz
- **Frequency Span**: 100 Hz/Div to 25 kHz/Div
- **Accuracy**: ± 5%, limited by display resolution and RBW
- **Timebase Accuracy**: See Reference Oscillator
- **Level**:
  - Vertical: Log, 10 dB/Div and 2 dB/Div
  - Vertical Resolution: 0.2 dB (2 dB/Div)
- **Overall Accuracy**: ± 2 dB
- **Distortion**: -60 dBc for two tones at “Sensitivity Level”
  - Phase Noise: -90 dBc at 20 kHz offset (RBW = 1 Hz to 1 kHz)
  - <100 dBc at 200 kHz offset (RBW > 1 kHz to 10 kHz)
- **Attenuator**: Scalable in 10 dB steps

### Bit Error Rate (BER) Meter (Optional)

- **Test Modes**:
  - **Generate**: Generate Data and Digital Modulated Waveforms and accept Digital Baseband Data extracted from the radio under test for and calculate BER.
  - **Receive**: Generate Baseband Data into the radio under test as the Source of Modulation and Receive/Demodulate Digital Modulation Waveforms and calculate BER
- **Range**: 1 x 10^1 to 1 x 10^8
- **Data**:
  - **Modes**: MIL-STD-188-114 Synchronous, RS-232 Asynchronous, X.21 Ethernet
  - **Data Rates**: 300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 12.8 kbps and 16.0 kbps
  - **Data Pattern Size**: 100 to 1,000,000 Bits
  - **Data Pattern Type**: Random, Fixed (511, 2047, Mark/Space), User defined
  - **Accuracy**: 1 x 10^-6
  - **External Input Level**: See BASEBAND and AUDIO Input Specification
  - **Modulation schemes**: FSK, BPSK
  - **Display**: Bit Error and Bit Error Rate
  - **Error injection**: Single and Fixed Rate Insertion

### General Characteristics

- **Dimensions**: 7.25" H x 17.875" W x 21.75" D (18.415 cm x 45.025 cm x 55.245 cm)
- **Weight**: <57 lb (24.95 kg) w/o accessories
- **AC Power**: 90 to 260 VAC
- **Frequency Power**: 50-400 Hz
- **Power**: 300 Watts typical
- **DC Power**: 20 thru 32 VDC (Optional)
ENVIRONMENTAL

<table>
<thead>
<tr>
<th>Design:</th>
<th>Per MIL-PRF-28800F, Class III</th>
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<tbody>
<tr>
<td>Reliability:</td>
<td>&gt;3000 Hours Per MIL-HDBK-781</td>
</tr>
<tr>
<td></td>
<td>Reference MIL-HDBK-217</td>
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<tr>
<td>Storage Temp:</td>
<td>-20 °C to +71 °C at 80% RH (non-condensing)</td>
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<tr>
<td>Operating Temp:</td>
<td>0 to +50 °C at 95% RH (non-condensing)</td>
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<tr>
<td>Humidity:</td>
<td>Per MIL-PRF-28800F, Class III (0 to 95%)</td>
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<td>Altitude:</td>
<td>Per MIL-PRF-28800F, Class III (4000 Meters/15000 feet)</td>
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<td>EMI/RFI:</td>
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<td>Vibration:</td>
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<td>Shock:</td>
<td>Per MIL-PRF-28800F, Class III (30g all axis)</td>
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<tr>
<td>Safety:</td>
<td>Per MIL-PRF-28800F, Class III &amp; EN 61010-1</td>
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OPTIONAL ITEMS

<table>
<thead>
<tr>
<th>Software Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASW-000 TestEZ TPS Development Toolset</td>
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<tr>
<td>ASW-011 Cable Fault Analyzer/Distance-to-Fault</td>
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<tr>
<td>ASW-012 RF Spectrum Analyzer</td>
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<tr>
<td>ASW-013 Dynamic (AF) Signal Analyzer</td>
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VERSIONS, OPTIONS AND ACCESSORIES

STANDARD ACCESSORIES

| ACC-006 AC Power Cord (6' - USA) |
| ACC-017 PS2 Standard Computer Mouse |
| ACC-022 200 MHz BW Scope Probes (2 probes) |
| ACC-025 DMM Probe Kit |
| ADP-001 N (M) to BNC (F) Adapters (2) |
| ADP-003 TNC (M) to BNC (F) Adapter |
| ADP-004 RG-223 BNC to BNC Cable |
| ANT-001 Antenna, 7 Section Telescopic (5 ½” to 24”) |
| AHW-010 Operators Manual |

optional Items

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