Wireless

3900 Series Analog and Digital Radio Test Platform

AEROFLEX
A passion for performance.

Featuring *IQCreator*™

New Generation PMR Test Platform

- 3901 - 1 GHz Frequency Range
- 3902 - 2.7 GHz Frequency Range
- High performance AM/FM analog duplex features
- TETRA mobile, base station and DMO tests
- P25 parametric analysis
- Remote site monitoring application
- HPD® (High Performance Data) base and mobile simulation
- Spectrum analyzer/tracking generator
- New AutoTest II operation
- Color display
- GPIB, Ethernet, USB and RS-232 interfaces
- Software upgradable in the field
- HP/Agilent 8920B remote emulation

The 3900 Series is the latest Radio Test Solution from Aeroflex for engineering, production and field service applications. The instrument provides a comprehensive range of general purpose analog measurement facilities as well as advanced digital test options for P25, TETRA and HPD systems.

Standard features include:

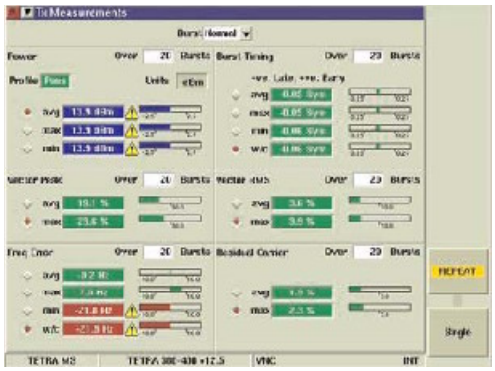
- Full AM and FM test capabilities
- Channel spectrum analyzer
- Full Span spectrum analyzer to 2.7 GHz (3902)
- Dual-Channel Oscilloscope to 4 MHz
- Full audio analysis for AF level, frequency, SINAD and distortion measurements
- Full RF parametric tests for power, frequency error, deviation (FM), modulation index (AM)
- Three high accuracy audio modulators/function generators
- Three high accuracy audio baseband generators
- DTMF and DCS generators NEW!
- FM pre-emphasis and de-emphasis 50 µs, 75 µs and 750 µs for true audio performance analysis
- Color codes Pass/Fail meter functions for fast test capabilities

The digital architecture of the 3900 Series delivers faster, accurate and more repeatable measurements than any of its predecessors and provides for future technology enhancements as new digital technology becomes available.

Combining the power of an onboard PC with a 30 GB hard-drive and Linux OS, the 3900 Series also supports USB mouse and keyboard

interface for very easy operation as well as almost unlimited save/recall setups, saving time and effort.

The 3900 Series features easy to read meters with Pass/Fail color coding for instant Go/NoGo testing. With these easy to configure meters, the user can set up unique Pass/Fail parameters for each radio type that is being tested. When used with the save/recall locations, this allows for instant recall of the test parameters so semi-technical or non-technical individuals can simply key the radio and test. The meters will display "Green" for good, "Red" for high and "Blue" for low. A quick glance and the operator will know that the radio is within established test parameters.



Tx Measurements Tile Maximized, Showing Green, Red and Blue Indications

The 3900 Series provides a flexible platform for almost any application. Each of the modes of operations can be enhanced with optional applications and features. In addition, optional system personalities allow the 3900 Series to be completely reconfigured "on the fly" to provide advanced tests for analog and digital systems.

High Performance Standard Features:

Wide Frequency Range: The 3900 Series includes two variants. The 3901 provides continuous frequency coverage from 10 MHz (usable down to 100 kHz) to 1 GHz while the 3902 extends the maximum frequency to 2.7 GHz.

Broadband RF Power: Direct input of signal power of up to 125 W is supported, making the 3900 Series compatible with virtually all practical requirements for mobile terminal and base station test.

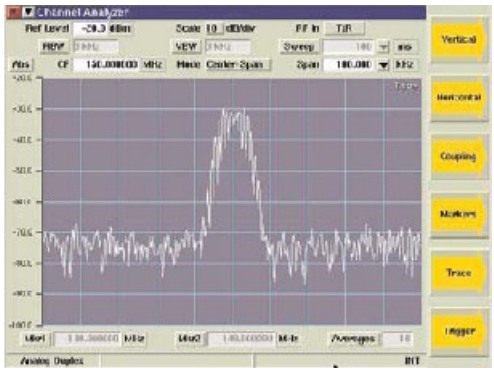
Inband Low Level RF Power Measurements: For sensitive measurement, e.g. off-air analysis, a low power input is provided via the antenna input port. This low level input gives the user the ability to measure an off the air signal as low as -100 dBm or -115 dBm with the internal pre-amp selected.

High Stability Time Base: With a 0.01 ppm OCXO frequency standard, the 3900 series provides ultra-reliable RF frequency measurements.

0.6 dB Accurate (Typical) RF Generators: Level accuracy is important in determining today's receiver performance in design, manufacturing and field service environments. With a 1 dB (0.6 dB typical) level accuracy on the RF output ports, the 3900 Series provides consistent results in testing receiver parameters.

Full Span Spectrum Analyzer: View signals from 1 MHz to 1 GHz with the 3901 or to a full 2.7 GHz with the 3902. This full band analyzer provides plenty of range to view harmonics and other spurious emissions in and out of band.

Wide Band Channel Analyzer: The channel analyzer makes it possible to monitor a 5 MHz spectral window around the carrier while simultaneously demodulating the signal. This allows the spectrum around the carrier to be analyzed while the device under test is participating in a call.



Channel Analyzer Tile Maximized

Dual-Channel 4 MHz Oscilloscope: High performance base band analysis of audio and digital signals can be performed easily and accurately.

High Performance Audio Features: With high accuracy audio generators from 1 mV to 8 V rms, the 3900 Series provides level accuracy to ± 1% of the setting. The audio generator frequency ranges from 20 Hz to 40 kHz with 50 ppm accuracy (10 ppm typical) and 0.1 Hz resolution provides solid audio performance for audio testing. The AF Counter features full range from 20 Hz to 20 kHz .

Speed: Measurement speed is directly related to processing power and internal communications. The 3900 Series digital architecture utilizes a mixture of powerful digital signal processors and programmable logic. Coupled to the use of a compact PCI backplane capable of delivering peak rates of > 100 Mbytes/s, this ensures that the instrument has the power to acquire, synchronize and process data, producing measurement results to the user with the minimum of delay.

Input and Output Capability: The 3900 Series provides a high degree of connectivity. Instrument remote control for automated testing is provided using GPIB and supports connection to a remote server via Ethernet. Connection of printers and other peripherals is supported including keyboard, mouse and external monitor connection to provide expansion of the instrument user interface. Triggering and synchronization interfaces are provided for measurement, along with configurable single-port and dual-port duplex RF input/output and analog audio/modulation I/O.

Ease of Use: Whether using the 3900 Series manually, remotely or in Auto-Test II mode, the user interface is intuitive, logical and accessible. The instrument uses a tiled graphical display, which can be controlled by the front panel keypad or an external mouse. Tiles can be viewed in their full-detail maximized state or the minimized state which shows key details and allows active tiles to be viewed at the same time for maximum information display.

3900 Tiled Graphical Users Interface

The color display produces a bright and sharp daylight readable image that can be output to an external monitor. Color coded fields are used to simplify testing and graphical traces utilize color to clearly identify limit line and measurement traces.

Remote Control: The 3900 Series supports remote control via GPIB for automated test system control. A VXI pnp VISA driver allows easy test system integration of the 3900 Series. In addition to a native 3900 command set, the 3900 Series also supports commands for the HP/Agilent 8920B that allows migration from the 8920B to the 3900 extremely easy.

Remote Operation: Use of the 3900 Series Ethernet connection permits remote operation from anywhere in the world making it possible to download new software or remotely interrogate instrument status. With an internal VNC server, users can install VNC software on their PC and remotely operate the front panel of the 3900 from virtually anywhere on the planet. All that is needed is the ability to access the unit's IP address.

Cost of Ownership: To manage through life costs, the 3900 Series comes with a standard 2-year warranty. Users can also purchase a 36 or 60 month warranty period extension with or without scheduled calibration. On request Aeroflex can provide customized premium warranty support designed around your specific needs.

Optional Application Software and Special Features Enhance Test Capabilities

Site Monitoring

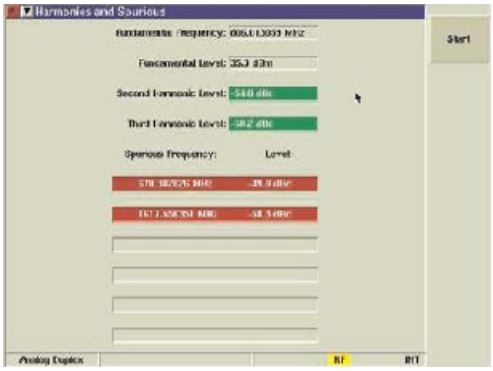
The 3900 Series brings impressive new capabilities to site monitoring applications. With 390XOPT051, the user now has the ability to leave the 3900 on-site while the unit provides automated data logging of the site's effective receiver sensitivity. When connected to a good documented receiver (a "golden" radio), the 3900 Series will automatically calculate the Effective Receiver Sensitivity (ERS) at a predetermined interval (example: every 10 seconds) over a specified time (example: log ERS for 72 hours). As these measurements are taken, a min/average/max SINAD is displayed and the data is logged to the 3900's internal hard-drive. Spectral information is also optionally logged with each measurement to help locate and track sources of interference. This gives the system engineer a valuable tool in determining site location performance and system RF boundaries. The 3900 Series provides the user with the ability to recall the ERS point at given intervals, as well as spectral data at each of the sample points to view interferes that may be present at one particular time, but not another (for example: 2AM).

IQ Gen Modulation

IQCreator™ is an Aeroflex developed PC based software utility that gives the user the ability to develop their own waveforms to use as the modulation source. Since the waveforms are defined by I and Q, virtually any type of complex digital modulation format can be created. Once the IQ waveform is created it can easily be uploaded to the 3900 and used as the modulation source in the Analog Duplex System.

Harmonics and Spurious

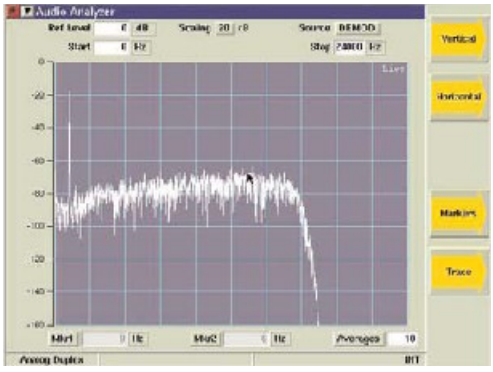
A new option for the 3900 Series is the ability to quickly and accurately measure the harmonics and spurious of the transmitter of a radio. The fundamental frequency is automatically detected and measured and then the second and third harmonics are measured and compared. In addition, the spurious signals that are higher than the configured level are identified and displayed.



Harmonics and Spurious Tile

Audio Analyzer

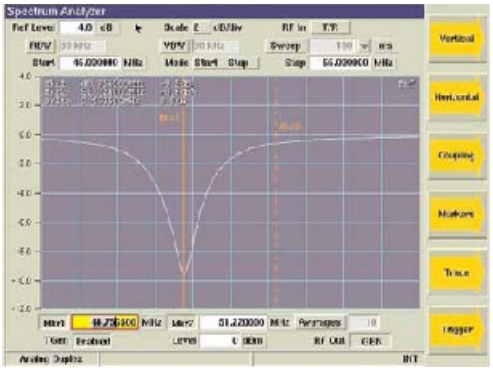
With 390XOPT055, the 3900 Series provides audio spectral analysis of the recovered audio signal, either from the audio inputs or from the demodulated RF signal. This feature allows users to view frequency amplitude in relation to other audio frequencies, and to isolate problems such as noise in audio circuits.



Audio Analyzer Tile Maximized

Tracking Generator

Now available as an option to the spectrum analyzer, the 3900 Series tracking generator allows the user to look at the response of a duplexer, filter bank or other RF device on the spectrum analyzer. When used with the optional return loss bridge (AC4105), the spectrum analyzer/tracking generator can measure the return loss of an antenna or cable (see screen below).



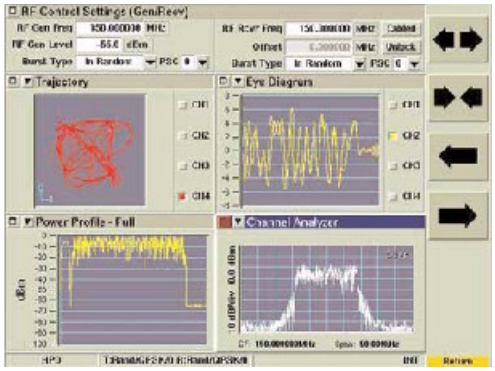
Spectrum Analyzer with Tracking Generator

OPTIONAL SYSTEM PERSONALITIES

With analog duplex featured as standard, the 3900 Series can support a number of optional test systems installed concurrently. Personalities include TETRA digital trunked radio systems for mobile terminal and base station testing, TETRA direct mode, HPD® (High Performance Data) and APCO P25 Conventional.

HPD® OPERATION

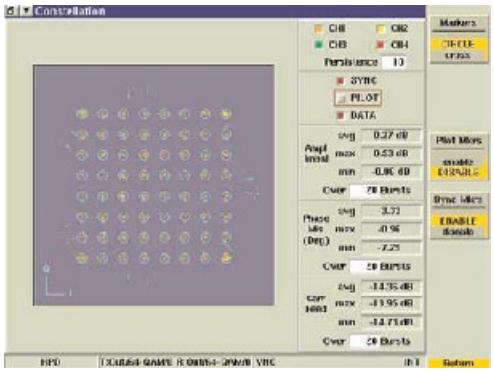
- Generate/receive HPD signals
- Modulation - 64QAM, 16QAM and QPSK
- Transmitter parameters including signal power, frequency error, EVM,
- Symbol clock error, RX BER, burst timing error and occupied bandwidth.
- I & Q modulation analysis including constellation and trajectory plots of the data symbols, synch and pilot bits.
- Display of Min/Max and average as specified by the number of bursts.
- Pass/Fail indication using color codes meters.



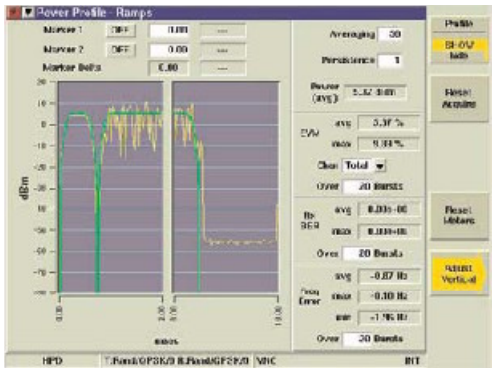
Example of HPD® Tiles

Aeroflex has developed this test mode for Motorola to address the need for testing their high performance packet data operation on both mobiles and base stations in the 700 and 800 MHz bands. HPD® systems operate within the normal 25 kHz mobile radio bandwidth. The 3900 HPD® options 390XOPT300 and 390XOPT301 provide users with the ability to test High Performance Data systems. HPD® can be configured for two modes of operation. When configured to operate in BR Mode the test set simulates base radio operation and is used to test the functionality of Motorola HPD® Mobile Subscriber Units (MSU). When configured to operate in MSU Mode the test set simulates Mobile Subscriber Unit operation and is used to test the functionality of Motorola Base Repeaters (BR). More advanced test features are available with 390XOPT301 including:

- Received Data Stream Logger. Logs the data portion of the HPD® signal and displays it in hex.
- RX Time Display. Shows Frequency Error, Power and Symbol Clock error over time.
- HPD® Magnitude/Phase Estimation. Displays magnitude and phase fluctuations of the received signal.
- Eye Diagram and I/Q over time displays
- Power Profile. Shows the power over time and in a burst (TDMA transmission).
- Power Ramps. Shows the power up and power down portion of the TDMA burst.



HPD® Constellation Tile Maximized

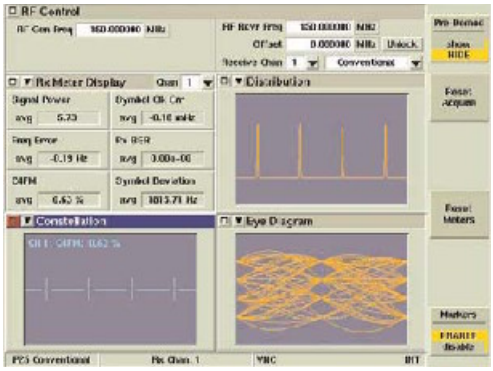


HPD® Power Profile - Ramps Tile Maximized

P25 Conventional Operation

- P25 C4FM error meter.
- Eye Diagram showing transitional diagram and points to the C4FM frequency states.
- Constellation Plot.
- Power, frequency error and TX BER meters
- Full TIA/EIA-102 test patterns (STD1011, CAL, SILENCE,LDU1 trigger, etc..) as specified by TIA-EIA-102-CAAA-A

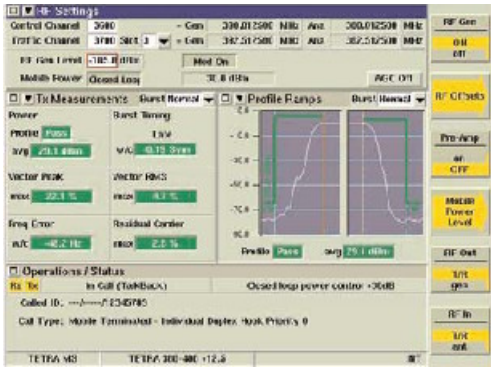
The 3900 Series P25 Conventional Option provides test features for testing P25 radios and systems. Included is the ability to transmit P25 C4FM standard waveforms and analyze P25 received waveforms. The analysis of the received waveforms includes the ability to perform RF and modulation parametric tests. This option, 390XOPT200, provides the first implementation of P25 on the 3900 Series and provides the basic parametric analysis of the P25 signal.



Example of P25 Conventional Tiles

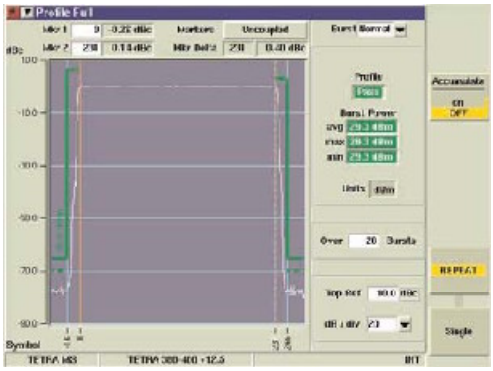
TETRA

- Generate/Analyze TETRA RF signals
- Base Station and Mobile Station testing plus testing with test signal T1
- Transmit parameter measurements including power, frequency error, EVM and burst timing
- TETRA RF power meter and burst power analysis up to 125 W
- Modulation analysis with I/Q constellation and trajectory display
- Receiver Bit Error Rate (BER) and Message Error Rate (MER) measurements
- Pass/Fail indication using color coded meters
- TETRA protocol analyzer/simulator
- Data display mode
- Time stamped protocol history
- New option for testing Direct Mode Operation (DMO)

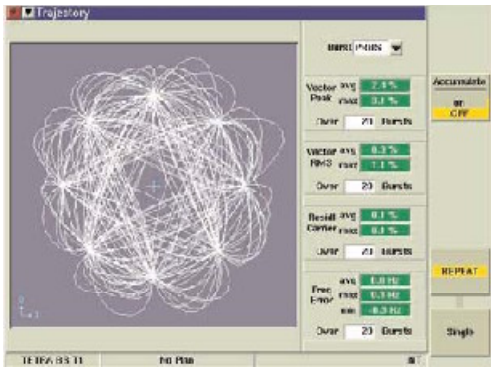


Example of TETRA MS Tiles

For TETRA applications, the 3900 Series is the successor to the Aeroflex 2968 TETRA Radio Test Set, the established industry standard for TETRA R&D, manufacturing, application development and service operations. Building upon the experience gained over many years of TETRA test, the 3900 Series with the TETRA options provides the world's best solution for testing TETRA radios. TETRA system options provide signaling and physical layer measurement requirements for testing TETRA radio equipment. Measurements are made in accordance with ETSI EN 300 394-1 for on channel transmitter and receiver parameters. Signaling functions support TIP (Tetra Interoperability Profile) compliant TETRA radios, thus ensuring optimum compatibility with TETRA equipment from various suppliers. Whatever the device under test, the TETRA system options have the flexibility to measure the various burst types specified by the TETRA standard including normal bursts, control bursts and synchronization bursts. The 3900 Series offers high speed measurement capabilities to expedite production testing. As a direct benefit of high power signal processing capacity, TETRA measurements are performed nearly 9 times faster than its predecessor.



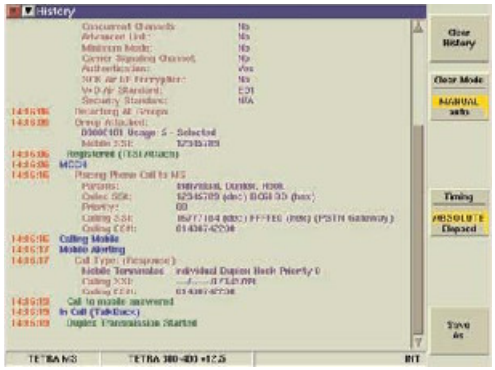
Profile Full Tile Maximized



TETRA Trajectory Tile Maximized

Call Processing Highlights

The 3900 Series can be freely configured to emulate a TETRA network by selection of the appropriate channel plan, country code, network code, color code, etc. Once configured, registration, group attachment and TETRA call types including group call, private call, emergency call, telephone call and user defined call can all be tested. SDS messages (types 1 to 4 and SDS-TL) can be sent or received. The 3900 Series TETRA system option displays a range of mobile reported information relating to registration, group attachment, test mode, call type, called party, status messages, text messages, and DTMF digits dialed.



Protocol History Maximized Tile

TETRA Test Mode T1 and T1 Loopback

The TETRA MS and TETRA BS options provides various T1 test signals as defined in ETSI EN 300 394-1, for performing manual testing of TETRA base station and mobile stations receivers. The test signal T1 in the MS T1 application, provides control information to the mobile to aid testing e.g. burst type, max, TX power, loopback commands. These T1 test signals can be used by the mobile in a test mode to output received demodulated data to a test interface for external processing of receiver Bit Error Rate (BER). Alternatively, the mobile can be commanded by the test signal T1 to loop back the received data to the 3900 Series which can then perform BER/MER/PUEM measurement. In the BS T1 application, the 3900 Series also supports T1 loopback BER/MER/PUEM measurements for base stations.

TETRA Test (TT) Protocol Support

The TETRA MS option provides support for the TETRA Test (TT) protocol as defined in ETSI EN 300 394-1. The TT protocol allows the mobile to be tested in a loopback mode whereby the mobiles BER, MER, and RBER can all be reported.

Audio Testing

Subjective audio testing is supported for simplex and duplex calls. Audio spoken into the mobile's microphone is received and stored by the test set, which then re-transmits the speech so that it is replayed through the mobile's speaker or ear piece with 2 seconds delay added, thus providing an end-to-end audio quality test.

Direct Mode Functionality

The 3900 Series also supports the testing of Direct Mode Operation. The 3900 Series can initiate or receive calls from a mobile that is operating in direct mode and then make transmitter measurements such as power, frequency error and modulation accuracy. The operation and graphical displays are very similar to the normal TETRA operation.

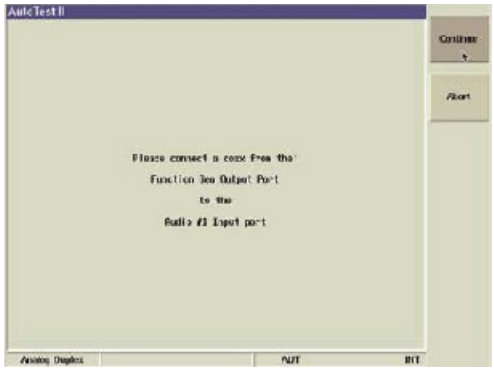
TETRA Energy Economy Mode

This optional mode of operation provides protocol signaling to control a mobile's energy economy mode from "Stay alive" through energy groups EG1 (shortest sleep) to EG7 (longest sleep) and is used in conjunction with the comprehensive signaling capabilities already within the TETRA MS option. This operation enables developers, operators and users to configure battery test scenarios to simulate particular operational conditions. It gives them the testing flexibility to characterize the expected battery life performance in its intended operational use on the network.

AUTO-TEST II

- Develop automated tests for AM/FM and P25 systems
- Design your own Graphical User Interface
- Uses TCL/TK scripting language
- Utilizes the full set of 3900 RCI commands

Available now as a new option for the 3900 Series is the Auto-Test II operation. Providing the ultimate in flexibility, this option gives the user the ability to control the operation of 3900 using the TCL/TK scripting language. The control of the functions of the 3900 is performed through the use of RCI commands, which are sent as part of the TCL/TK program developed by the user.



Example of Auto-Test II Display

SPECIFICATION

RF SIGNAL GENERATOR

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)
10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Resolution

1 Hz

Accuracy

Frequency standard ± 1 count

OUTPUT LEVEL

Range

T/R Port: -130.0 to -30.0 dBm

Duplex: -130.0 to + 10.0 dBm (+ 10 dBm max for CW or FM; 0 dBm max for complex modulation)

Resolution

0.1 dB

Accuracy (for level > -110 dBm)

T/R port: ± 1.0 dB (Typical better than ± 0.6 dB)

GEN port: ± 1.0 dB (Typical better than ± 0.6 dB)

SPECTRAL PURITY

Residual FM

< 15 Hz (300 Hz to 3 kHz bandwidth)

Residual AM

< 0.1% RMS (300 Hz to 3 kHz bandwidth)

Harmonics

< -34 dBc (Typically -40 dBc, RF level set at + 10 dBm)

Non-Harmonics

< -55 dBc (all freq. except crossovers)

< -35 dBc (Crossover freq. = 3411.4 MHz - Gen freq.)

Phase Noise

< -93 dBc/Hz (20 kHz offset, RF < 1.05 GHz)

< -90 dBc/Hz (20 kHz offset, RF > 1.05 to 2.7 GHz)

MODULATION

INTERNAL FM

RF Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Deviation

± 0.001 to ± 150 kHz, OFF

Accuracy

3% (From ± 1 kHz to ± 100 kHz deviation, 20 Hz to 15 kHz rate)

Resolution

1 Hz

Deviation Rate

20 Hz to 15 kHz

Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch, DTMF

THD

< 1% (1 kHz rate, 6 kHz deviation, 300 Hz to 3 kHz BW)

INTERNAL AM

RF Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Modulation Range

0 to 100%

Accuracy

1% (Modulation from 10 to 90%)

Resolution

0.1%

Rate

20 Hz to 15 kHz

Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch, DTMF

THD

< 1% (1 kHz rate, 30 to 70% AM, 300 Hz to 3 kHz BW)

INTERNAL SINGLE-SIDEBAND (SSB)

RF Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)
10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Modulation Selection

Upper SideBand (USB) or Lower SideBand (LSB)

Modulation Range

0 to 100%

Resolution

0.1%

Rate

300 kHz to 3 kHz

Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch

EXTERNAL AM/FM/SSB

AUDIO INPUTS

With 1 Vrms, AM/FM/SSB have same characteristics as internal sources, ± 10% of indicated setting. (Audio 1 or Audio 2 input from 20 Hz to 15 kHz (300 Hz to 3 kHz SSB) unbalanced).

MICROPHONE INPUT

With 50 mVrms, AM/FM/SSB have same characteristics as internal sources, ± 10% of indicated setting. (MIC Input from 100 Hz to 15 kHz (300 Hz to 3 kHz SSB)).

INTERNAL I-Q (OPTIONAL)

RF Range

10 MHz to 1.05 GHz (3901) (usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (usable from 100 kHz)

Modulation

IQCreator® file downloads for custom I-Q modulation

RF RECEIVE MEASUREMENTS

RF RECEIVER

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

SENSITIVITY

< -100 dBm (10 dB SINAD, FM, 25 kHz, 1 kHz rate, 6 kHz FM deviation, 300 Hz to 3.4 kHz AF filter, pre-amp OFF)

< -113 dBm (10 dB SINAD, FM, 25 kHz, 1 kHz rate, 6 kHz FM deviation, 300 Hz to 3.4 kHz AF filter, pre-amp ON)

SELECTIVITY

IF Bandwidth

6.25, 8.33, 10, 12.5, 25, 30, 100, 300 kHz filters

DEMOD OUTPUT LEVEL

FM

2.5 Vrms ± 10% (for deviation ± ½ of selected BW; 25 kHz BW same output level as 30 kHz BW)

AM

3.0 Vrms ± 10% (for 100% AM)

RF COUNTER

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz, auto-tune)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz, auto-tune)

Resolution

1 Hz

Accuracy

Frequency standard ± 1 count

Level (Range)

T/R port: -10 to + 50 dBm (Find level is selectable)

ANT port: -60 to + 10 dBm (Find level is selectable)

RF POWER METER (BROAD BAND)

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Level

100 mW to 125 W (Usable from 10 mW)

Resolution

4 digits for W or 0.1 dB

Accuracy

10%, ± 1 digit

Power Measurement Range

T/R port: 100 mW to 125 W (25% on/off ratio)

RF POWER METER (IN BAND)

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Level

T/R port: -60 to + 51 dBm

Lowest reading is receiver BW dependent (Narrower bandwidths can measure lower levels).

ANT port: -100 to + 10 dBm

Lowest reading is receiver BW dependent (Narrower bandwidths can measure lower levels).

AM Filter BW

6.25, 8.33, 10, 12.5, 25 and 30 kHz

FM Filter BW

6.25, 10, 12.5, 25, 30, 100, and 300 kHz

Resolution

0.1 dB

Accuracy (after user calibration, Preamp OFF)

± 1 dB (Input level above minimum for selected BW (display not yellow); typically better than ± 0.6 dB)

RF ERROR METER

Counter Range

0 to ± 2.5 MHz from receiver frequency (6 MHz IF BW)

Accuracy

Frequency standard ± 1 count

Resolution

1 Hz

Level

T/R port: -10 to + 50 dBm

ANT port: -60 to + 10 dBm

DEMODULATION METERS

DEMOD COUNTER

FREQUENCY

Range

20 Hz to 20 kHz (1 to 100 kHz FM deviation, IF BW set appropriately for the received modulation BW)

20 Hz to 10 kHz (30% to 90% AM, IF BW set appropriately for the received modulation BW)

Resolution

0.1 Hz

Accuracy

± 50 ppm ± 1 count (± 10 ppm typical)

Input Waveform

Sine or Square

RF CHARACTERISTICS

Input RF

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

RF Level

T/R port: -10 to + 50 dBm

ANT port: -80 to + 10 dBm

FM DEVIATION METER

Range

0 to 150 kHz

Scales

1 to 200 kHz in a 1, 2, 5 sequence, plus auto-scale

Resolution

10 Hz

Accuracy

± 3% plus source residual, ± 1 count (1 to 150 kHz FM deviation, IF BW set appropriately for the received modulation BW)

FM CHARACTERISTICS

Rate

20 Hz to 20 kHz (IF BW set appropriately for the received modulation

BW)

RF Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

RF Level

T/R port: - 10 to + 50 dBm

ANT port: -80 to + 10 dBm

AM METER

Range

0 to 100%

Scales

1 to 100% in a 1, 2, 5 sequence, plus auto-scale

Resolution

0.1%

Accuracy

± 3 % + source residual, ± 1 count (30 to 90% AM, IF BW set appropriately for the received modulation BW)

AM CHARACTERISTICS

Rate

20 Hz to 15 kHz (IF BW set appropriately for the received modulation BW)

RF Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

RF Level

T/R port: -10 to + 50 dBm

ANT port: -80 to + 10 dBm

AUDIO FUNCTION GENERATOR(S)

Up to 3 function generators can be combined into 1 output signal.

WAVESHAPE

Sine, Square, Triangle, Ramp, Digital Coded Squelch, DTMF

FREQUENCY

Range

Sine: 20 Hz to 40 kHz (usable 1 Hz to 40 kHz)

Square, Triangle and Ramp: 20 Hz to 4 kHz (usable 1 Hz to 15 kHz)

Resolution

0.1 Hz

Accuracy

± 50 ppm ± 1 count max, ± 10 ppm typical

LEVEL (SINE)

Range

1 mV to 5V RMS into a 10 kΩ load

Resolution

0.1 mV

Accuracy

± 1% of setting (10 kΩ load)

Impedance

600 Ω (nominal)

Spectral Purity

< 0.5% (1 kHz, 5 Vrms, 80 kHz BW, 10 kΩ load, Sine)

< 1.0% (Typical, 20 Hz to 40 kHz, 100 mV to 5 Vrms, 80 kHz BW, 10 kΩ load, Sine)

AUDIO AND MODULATION MEASUREMENTS

AF COUNTER

Range

20 Hz to 20 kHz (usable from 10 Hz)

Resolution

0.1 Hz

Accuracy

± 50 ppm max, ± 1 count, ± 10 ppm typical

Waveshape

Sine or square

SIGNAL CHARACTERISTICS

Level

10 mV to 5 Vrms (Audio 1 or Audio 2)

Impedance

600 Ω or Hi-Z (Hi-Z is ~ 10 kΩ)

600 Ω balanced (Audio 1 and 2)

AF LEVEL METER

Input

Audio 1 or 2

Range

0 to 8 Vrms

Resolution

1 mV (Unbalanced)

0.1 dB (600 Ω Balanced)

Scales

20 mV to 5 V in a 1, 2, 5 sequence, plus auto-scale

Frequency

20 Hz to 20 kHz

Accuracy

5% (Unbalanced, Hi-Z, 300 to 3 kHz, 0.1 to 5 Vrms)

SINAD METER

Range

0 to 60 dB

Resolution

0.01 dB

Accuracy

± 1 dB, ± 1 count (SINAD > 3 dB, ≤ 40 dB, 5 kHz LP AF filter)

SIGNAL CHARACTERISTICS

Signal Frequency

300 Hz to 5 kHz (Entry Range - 0 Hz to 24,000 Hz)

Signal Level

0.1 to 8 Vrms

Audio 1 or 2 (600 Ω or Hi-Z)

Audio 1 and 2 (600 Ω balanced)

DISTORTION METER

Range

0.0% to 100.0%

Resolution

0.1%

Accuracy

< ± 0.5% (Distortion 1% to 10%, 5 kHz LP AF filter)

< ± 1.0% (Distortion 10% to 20%, 5 kHz LP AF filter)

SIGNAL CHARACTERISTICS

Signal Frequency

300 Hz to 5 kHz (Entry Range - 0 Hz to 24,000 Hz)

Signal Level

0.1 to 8 Vrms

Audio 1 or 2 (600 Ω or Hi-Z)

Audio 1 and 2 (600 Ω balanced)

AUDIO FILTERS

None

Low Pass: 300 Hz, 5 kHz, 20 kHz

Band Pass: 300 Hz to 3.4 kHz, 300 Hz to 5 kHz, 300 Hz to 15 kHz, 300 Hz to 20 kHz, psophometric (CMESS or CCITT weighted)

High Pass: 300 Hz, 15 kHz

HUM AND NOISE

Meter Range

-100 dB to 0 dB

Operation Range

-65 dB to 0 dB

Resolution

0.01 dB

Accuracy

± 1 dB, ± 1 count (> -60 dB, ≤ -20 dB)

SIGNAL CHARACTERISTICS

RF Level (FM Demod)

T/R Port: - 10 to + 50 dBm

ANT Port: -80 to + 10 dBm

SIGNAL-TO-NOISE RATIO (SNR)

Modes

Mode	*Stimulus*	*Stimulus Port*	*Measurement Input*	*Measurement Port*
1	RF Generator	TR / Gen	AF Input	Audio In 1/2
2	AF Generator	Fctn Gen Out	RF Receiver	TR/Antenna

Meter Range

0 to 60 dB

Resolution

0.01 dB

Accuracy

± 1 dB, ± 1 count (> 3 dB, ≤ 40 dB, 5 kHz LP AF Filter)

SIGNAL CHARACTERISTICS

Signal Frequency

300 Hz to 5 kHz (Entry Range - 0 Hz to 24,000 Hz)

Audio In put Signal Level (Mode 1)

0.1 to 5 Vrms

Filter	*Type*	*Ripple*	*-1 dB*	*-60 dB*
NONE	No Filter	< ± 0.2 dB, above 20 Hz	20 kHz	24 kHz
300 Hz	Low-Pass	< 0.2 dB, above 20 Hz	400 Hz	800 Hz
5 kHz	Low-Pass	< 0.2 dB, above 20 Hz	5 kHz	5.4 kHz
15 kHz	Low-Pass	< ± 0.2 dB, above 20 Hz	16.5 kHz	18 kHz
20 kHz	Low-Pass	< ± 0.2 dB, above 20 Hz	20 kHz	21 kHz
0.3 to 3.4 kHz	Band-Pass	< 0.2 dB	200 Hz / 3.7 kHz	80 Hz / 4.4 kHz
0.3 to 5 kHz	Band-Pass	< 0.2 dB	200 Hz / 5 kHz	80 Hz / 5.4 kHz
0.3 to 15 kHz	Band-Pass	< ± 0.2 dB	200 Hz / 16.5 kHz	80 Hz / 18 kHz
0.3 to 20 kHz	Band-Pass	< ± 0.2 dB	200 Hz / 20 kHz	80 Hz / 21 kHz
PSOPH C-MSG	Band-Pass	Per C-MSG Spec	Per C-MSG Spec	Per C-MSG Spec
PSOPH CCITT	Band-Pass	Per CCITT Spec	Per CCITT Spec	Per CCITT Spec
300 Hz	High-Pass	< 0.2 dB	200 Hz	80 Hz

Audio 1 or 2 (600 Ω or Hi-Z)

Audio 1 and 2 (600 Ω Balanced)

RF Level Input (Mode 2)

T/R Port: - 10 to + 50 dBm

ANT Port: -80 to + 10 dBm

AUDIO FILTERS (CHARACTERISTIC RESPONSE)

RF SPECTRUM ANALYZER

FREQUENCY

Range

10 MHz to 1.05 GHz (3901) (Usable from 100 kHz)

10 MHz to 2.7 GHz (3902) (Usable from 100 kHz)

Resolution

1 Hz

Frequency Accuracy

Same as frequency standard

Span

Span mode: start/stop, center/span and zero span

Span width: 2 kHz to full span

Display Accuracy

Span accuracy + frequency accuracy + 50% of RBW

Span Range

Selection list is 2 kHz to full span in a 1, 2, 5 sequence, plus zero span (Span may be entered numerically down to 1 Hz resolution)

Span Accuracy

± 1% of span width

Marker Accuracy

± 1% of span width

LEVEL

Ref Level Range

T/R port: -50 to + 50 dBm

ANT port: -90 to + 10 dBm

Vertical Scales

1, 2, 5, 10 dB/division

Reference Level Resolution

0.1 dB

Ref Level Units

dBm, dBµV, dBmV

Dynamic Range

70 dB (Antenna, no attenuation, ref level -30 dBm, 30 kHz RBW)

Bandwidth Switching Error

± 1 dB (After normalize)

Log Linearity

± 1 dB

Accuracy

± 1 dB (Input signal -10 dB from ref level, normalized, preamp off)

Attenuator Selections

0 to 50 dB of attenuation, controlled by changing the ref level

3rd Order Intermodulation

-60 dBc (Input level of -30 dBm, ref level at -20 dBm)

Harmonic Spurious

-55 dBc (Input level of -30 dBm, ref level at -20 dBm)

Non-Harmonic Spurious

-60 dBc (Input level of -30 dBm, ref level at -20 dBm)

Displayed Average Noise Level (DANL)

-125 dBm (Typical, 300 Hz RBW, ANT port terminated, 20 sweep average)

RESOLUTION BANDWIDTH

RBW Selections

300 Hz, 3 kHz, 30 kHz, 60 kHz, 300 kHz, 6 MHz

RBW 60 dB/3 dB Filter Shape

>10:1

Selectivity - Filter Shape

60 dB/3 dB ratio better than 10:1

Accuracy

± 10% of RBW for 3 kHz, 30 kHz, 60 kHz, 300 kHz

-10% / + 25% of RBW FOR 6 MHz

± 20% of RBW for 300 Hz

Bandwidth Switching Error

± 1 dB

VIDEO BANDWIDTH

10 Hz to 1 MHz in a 1, 3, 10 sequence, plus NONE

SWEEP

Frequency Sweep Time

100 mS to 100 S in 1 ms increments

Zero Span Sweep Time

50 mS to 100 S in 1 ms increments

Sweep Trigger Source

Internal and external

Trigger Modes

Continuous (repeat), single (single-shot)

FUNCTION/FEATURE

Display Modes

Live, average, max hold

Averages

1 to 100

MARKERS

Track

Frequencies (or time) and amplitudes

Number of Markers

2

Marker Functions

Marker to peak

Marker to next right/left

Marker to minimum

Marker to ref level

Marker to center frequency

Marker sets span

Marker sets vertical scale (zero span only)

TRACKING GENERATOR

TRACKING GENERATOR OUTPUT

Refer to RF SIGNAL GENERATOR section for:

Frequency range and accuracy

Output level range, resolution and accuracy at center frequency

Spectral purity

CENTER FREQUENCY, SPAN, SWEEP TIME

Same as Spectrum Analyzer

TRACKING GENERATOR CONTROLS

Output port selection

RF level

Reference cal

OSCILLOSCOPE

DISPLAY

Traces

2

Trace Types

Live, captured, accumulated

Markers

2

Marker Functions

Time with amplitude, deviation or %depth

Delta marker (including 1/Δ t, e.g. Hz)

VERTICAL

3 dB Bandwidth

16 MHz

Frequency Range

DC to 4 MHz (40 MS/s sampling rate)

Input Range

0 to 100 Vpeak

Scales

2 mV to 20 V/division in a 1, 2, 5 sequence (8(h) x 10 (w) graticule display)

Accuracy

5% of full scale (DC to 1 MHz)

10% of full scale (1 to 4 MHz)

Resolution

Better than 1% of full scale

Coupling

DC, AC, GND

HORIZONTAL

Sweep Factors

1 µSec to 1 Sec/division in a 1, 2, 5 sequence

Accuracy

> 1.5% of full scale

Resolution

> 1% of full scale

Input Impedance

1 MΩ, 20 pF

TRIGGER

Trigger Source

Trace A, trace B, EXT, (or trace C with no CH1 or CH2 Input)

Trigger Edge

Rising/falling

Trigger Mode

Auto/normal

Continuous/single shot

External Trigger Level

Hi-Z BNC input on the rear panel of the unit

Adjustable from -5 to + 5 V

FREQUENCY STANDARD I/O

INTERNAL FREQUENCY STANDARD OUTPUT (OCXO)

Frequency

10 MHz (nominal)

Output Level

1 Vpp (nominal) into 50 Ω

Temperature Stability (0 to 50 degrees C)

± 0.01 ppm

Aging Rate

± 0.1 ppm/year after 1 month continuous use

Warm Up Time

Less than 5 min. to ± 0.02 ppm

EXTERNAL FREQUENCY INPUT

Frequency

10 MHz

Input Level

1 to 5 Vpp for sine waves

3.3/5 V TTL for square waves

Connector

BNC socket (10 kΩ Input/50 Ω Output)

AUDIO SPECTRUM ANALYZER (OPTIONAL)

FREQUENCY

Range

Start and Stop Frequency - 0 Hz to 24,000 Hz

Resolution

1 Hz

Accuracy

± 50 ppm, ± 10 ppm Typical

Span

2 kHz minimum to 24 kHz maximum

LEVEL

Vertical Scales

1, 2, 5, 10, 20 dB per division

Reference Level

0 dB Full Scale (dBr)

Dynamic Range

Greater than 120 dB

Accuracy

± 1 dB from 300 Hz to 15 kHz

MARKERS

Number of Markers

2

HARMONICS AND SPURIOUS (OPTIONAL)

HARMONIC LEVEL

Range

0 to -60 dBc

Resolution

0.1

Accuracy

Same as spectrum analyzer

SPURIOUS LEVEL

Range

0 to -60 dBc

Resolution

0.1

Accuracy

Same as spectrum analyzer

INPUT/OUTPUT CONNECTORS

ANT (RF INPUT)

Connector Type

TNC

Function

Receiver input (input port)

Impedance

50 Ω (nominal)

VSWR (with Att ≤10 dB):

Better than 1.44:1 (RF freq. < 1.05 GHz)

Better than 1.58:1 (RF freq. > 1.05 GHz to < 2.7 GHz)

Input Protection

10 W with warning above + 17 dBm (Remove power immediately when alarm sounds)

GEN (RF OUTPUT)

Connector Type

TNC

Function

Generator high-level output (output connector)

Impedance

50 Ω (nominal)

VSWR (with level < 0 dBm):

Better than 1.7:1 (RF freq. < 1.05 GHz)

Better than 1.9:1 (RF freq. > 1.05 GHz to < 2.7 GHz)

Input Protection

10 W with warning above + 23 dBm (Remove power immediately when alarm sounds)

T/R (RF INPUT/OUTPUT)

Connector Type

Type N

Function

RF power input, generator low-level output (input/output connector)

Impedance

50 Ω (nominal)

VSWR

Better than 1.2:1 (RF freq. < 1.05 GHz)

Better than 1.3:1 (RF freq. > 1.05 GHz to < 2.7 GHz)

Input Protection

200 W with warning above 135 W or power termination temp > 100°C. Recommend max of 30 s ON and minimum of 2 min OFF for power levels above 50 W. (Remove power immediately when alarm sounds)

GPIB

Connector Type

24 pin IEEE

Function

IEEE-488.1-1997

ETHERNET

Connector Type

8 Position, RJ-45 100/10 Mbit/s

Function

10/100 Base-T network connection

VIDEO

Connector Type

15-pin, D-sub, VGA

Function

VGA for external monitor

MIC/ACCESSORY

Connector Type

8 position, female DIN

Function

Microphone connection, modulation input, demod output

PARALLEL PORT

Connector Type

25 position, female D-sub

Function

Printer interface

USB

Connector Type

Twin USB standard connection

Function

USB Version 1.1 interface

PS/2 INTERFACE

Connector Type

Dual-PS/2 connectors

Function

Keyboard interface

TEST PORT

Connector Type

15 position, female 3 tier D-sub

Function

Programmable I/O and voltage output (optional interface)

POWER REQUIREMENTS

AC

Voltage

100 V to 120 VAC @ 60 Hz

220 V to 240 VAC @ 50 Hz

Power Consumption

Nominally 120 W (200 W Max)

Mains Supply Voltage Fluctuations

≤ 10% of the nominal voltage

Fuse Requirements

3 A, 250 V, Type F

ENVIRONMENTAL

OPERATING TEMPERATURE

0 to 50°C (Tested in accordance with MIL-PRF-28800F Class 3)

WARM-UP TIME

15 minutes

STORAGE TEMPERATURE

-40 to 71°C (Tested in accordance with MIL-PRF-28800F Class 3)

RELATIVE HUMIDITY

80% up to 31°C decreasingly linearly to 50% at 40°C (Tested in accordance with MIL-PRF-28800F Class 3)

ALTITUDE

4,000 m (13,123 ft) (MIL-PRF-28800F Class 3)

SHOCK AND VIBRATIONS

30 G Shock (functional shock)

5-500 Hz random vibrations (Tested in accordance with MIL-PRF-28800F Class 3)

USE

Pollution degree 2

RELIABILITY

> 8,000 hour calculated MTBF

SAFETY STANDARDS

UL 61010B-1

EN 61010-1

CSA C22.2 No. 61010-1

DIMENSIONS AND WEIGHT

Height	*Width*	*Depth*
19.7 cm (7.75")	*35.6 cm (14")*	*52.0 cm (20.5")*

Weight

16.5 kg (36.8 lbs.)

SYSTEM CONFIGURATION

The following information is provided to help the user understand what instruments are available on the 3900 Digital Radio Test Set.

AVAILABLE 3900 SYSTEMS

TETRA SYSTEMS (All TETRA systems are optional)

Available Options

Option 110 - TETRA MS (Mobile Station) and TETRA MS T1 - Compatible with software versions 1.0 and higher

Option 111 - TETRA BS (Base Station) and TETRA BS T1 - Compatible with software versions 1.0 and higher

Option 112 - TETRA DM (Direct Mode) A
Compatible with software versions 1.2 or higher

ANALOG SYSTEMS (Analog functions are provided as standard, but have options available under analog configuration.)

Option 051 - Remote Site Monitoring Application - Compatible with-software versions 1.1 and higher

TETRA CHANNEL PLANS AND SIGNALLING

Channel Plans

TETRA 380-400 (0 Hz or 12.5 kHz offset)

TETRA 410-430 (0 Hz, -6.25 kHz or 12.5 kHz offset)

TETRA 450-470 (0 Hz or 12.5 kHz offset)

TETRA 805-870 (0 Hz or 12.5 kHz offset)

TETRA 870-921 (0 Hz or 12.5 kHz offset)

No plan

User defined

System Identity

Mobile Country Code, MCC

Mobile Network Code, MNC

Base Color Code, BCC

Location Area Code, LA

Test Modes

Manual test/Auto-Test MS (see Auto-Test)

Manual Test Signaling Functions (TETRA MS mode only)

Protocol functions are compatible with TIP compliant mobiles.

Mobile parameter control for SSI, GSSI, power class, receiver class

Registration, test mode registration and de-registration

Private (individual) call, group call, phone call, emergency call, user defined call (mobile terminated)

Call timer and trunking type selection

Cell-re-selection (requires two test sets and a power splitter)

Short data service

Status message and SDS types 1 to 4call control (simplex calls)

Power control

Frequency control

Frequency handoff

RF loopback control (TT)

Display of mobile information

Demodulated and channel decoded data

Protocol history display

Subjective mobile audio tests

Talk back, silence and test tone (1 kHz digitally encoded)

TETRA MEASUREMENTS

TETRA RECEIVER MEASUREMENTS

TETRA MS T1 mode, TETRA MS mode, TETRA BS T1 mode (T1 loop-back, TT loopback BER, MER, PUEM, RBER, with pre-set/user defined limit checking, subjective audio testing, (TETRA MS mode), audio talk-back, test tone, silence)

BER Testing (TETRA MS T1 mode)

BER, MER and PUEM

BER Testing (TETRA MS mode)

BER, RBER and MER

BER Testing (TETRA BS T1 mode)

BER, MER and PUEM

SINAD Meter

Same as platform specifications. Not available in direct mode (DM)

TETRA TRANSMITTER MEASUREMENTS

RF power, RF power profile, burst timing, error vector magnitude, frequency error, residual carrier each with pre-set/user defined result limit checking

Input Range

T/R: -40 dBm to + 40 dBm
Ant: -80 dBm to 0 dBm

Burst Types

MS: Control Burst (CB), Normal Uplink Burst (NUB)

BS: Normal Downlink Burst (TS1+2, TS1, and TS2),

Synchronization Burst, PRBS with no training sequence

TETRA RF POWER METER

Average power across the useful part of the burst measured at the symbol points through a TETRA filter. Results available for avg, max and min for a sample of up to 250 bursts

Units

dBm/W

Resolution

0.1 dB / 1 mW

Indication

Numerical value, bar chart and progress indicator

Accuracy

± 1.0 dB (± 0.6 dB typical)

Level Offset Range

± 40.0 dB

TETRA RF POWER PROFILE

(see graphical displays)

BURST TIMING ERROR (MS/MS T1 ONLY)

Timing error relative to downlink results available for avg, max, min and worst case for a sample of up to 250 bursts

Range

± 510.00 symbols

Indication

Numerical value, bar chart and progress indicator

Accuracy

± 0.05 symbols

Timing offset range

± 999.99 symbols

MODULATION ACCURACY

Modulation accuracy measures the displacement of symbol points from their ideal position. Results available for avg. and max for a sample of up to 250 bursts

Modulation Error Range

20.0% RMS vector error

40.0% Peak vector error

20.0% Residual carrier

Indication

Numerical value, bar chart and progress indicator

Accuracy

± 0.5% at 10% error

FREQUENCY ERROR

Frequency error is the error relative to the expected frequency.

Results available for avg., max, min and worst case for a sample of up to 250 bursts

Frequency Error Range

± 500.0 Hz

Indication

Numerical value, bar chart and progress indicator

Accuracy

± 15 Hz + frequency standard accuracy

GRAPHICAL DISPLAYS

BAR CHARTS

Display of average, max, min and worst case values as appropriate with progress bar. Bar chart is color coded to indicate pass, fail low, fail high or accumulating.

POWER PROFILE DISPLAY

Display of power versus time for a complete burst or ramp up/ramp down intervals measured at the symbol points and displayed relative to a TETRA mask (TETRA limits or user defined) with pass/fail indication. Measured through a TETRA filter referenced (0 dB) to average power. Displayed profile and pass/fail indication are available as the average for a sample of up to 250 bursts. (N.B. multiple burst averaging is NOT available for the other graphical displays, only for the power profile).

Power Profile Dynamic Range

70 dB

Vertical Scale

20 dB/div or 0.1 dB/div in 1, 2, 5 steps

Accuracy

± 1.0 dB (± 0.6 dB typical) at symbol points for levels greater than -10 dB

CONSTELLATION DISPLAY

Polar display of amplitude versus phase at the symbol point measured over all symbols (SN0 ~ SN max) through a TETRA filter. Also available as a rotated constellation display where all symbol point values are mapped to a single constellation point.

PHASE TRAJECTORY DISPLAY

Polar display of amplitude versus phase continuously measured over the duration (SN0 ~ SN max) through a TETRA filter.

VECTOR ANALYSIS DISPLAYS

Vector error (%), magnitude error (%) and phase error (degrees) measured at symbol points (SN0 ~ SN max) through a TETRA filter.

Vertical Scaling

Vector error 0.1 %/div to 20 %/div in 1, 2, 5 steps

Phase error ± 0.1 °/div to ± 20 °/div in 1, 2, 5 steps

Magnitude error ± 0.1 %/div to ± 20 %/div in 1, 2, 5 steps

Display Features

Optimized/,aximized

Trace re-fresh or accumulate

Limit lines/checking

Display Mode

Single/repeat

Symbol Markers

Mkr 1 and Mkr 2 plus Mkr Delta, coupled/uncoupled (not available on phase trajectory and constellation displays)

TETRA SIGNAL GENERATOR

Specification as per platform specification unless otherwise stated

TETRA MODULATION

π/4 DQPSK, 18 k symbols/sec, TETRA filter, (RRC with < = 0.35)

Level

T/R Port -130 dBm to -40 dBm

Gen Port -130.0 dBm to 0 dBm

Accuracy

± 1.0 dB

Vector Error

< 3% RMS

< 6% peak

Residual Carrier Power

< -35 dBc

Data TETRA MS mode

Main Control Channel (MCCH) Traffic Channel (TCH/S) containing silence or 1 kHz tone or talk-back, Fast Associated Control Channel (FACCH)

Data TETRA MS T1 mode

T1 test signals (in accordance with ETSI EN 300 394-1) T1 type 1 (TCH/7.2), T1 type 2 (SCH/F), T1 type 3 (BSCH + SCH/HD), T1 type 4 (TCH/2.4), T1 type 15 (TCH/S), T1 type 17 (TCH/4.8)

Data TETRA BS T1 mode

T1 test signals (in accordance with ETSI EN 300 394-1) T1 type 7 (TCH/7.2), T1 type 8 (SCH/F), T1 type 9 (STCH+ STCH UL), T1 type 10 (TCH/2.4), 18 Frame PRBS, Framed PRBS, Unframed PRBS

BS T1 Synchronization Mode

Pulse or Auto

GENERAL FEATURES

LCD DISPLAY Screen Size

6.4 in diagonal

162.6 mm diagonal

Active Area

129.6 mm (h) x 97.44 mm (v)

5.1 in (h) x 3.8 in (v)

Resolution

640 x 480 pixels

Disk storage

3.5 inch floppy disk

Internal 30 GByte hard disk available for user storage

VERSIONS AND ACCESSORIES

When ordering please quote the full ordering number information.

Ordering Numbers	Versions
IFR3901	Advanced Radio Test System - 1 GHz
IFR3902	Advanced Radio Test System - 2.7 GHz

Supplied with

Operating and Programming Manual (CD ROM)

AC Supply Lead

Options

390XOPT051	Remote Site Monitoring application
390XOPT054	IQ Gen
390XOPT055	Audio Analyzer
390XOPT059	Auto-Test II Analog
390XOPT060	Harmonics and Spurious
390XOPT061	Tracking Generator
390XOPT110	TETRA MS (Mobile Station)
390XOPT111	TETRA BS (Base Station)
390XOPT112	TETRA DM (Direct Mode)
390XOPT114	TETRA Energy Economy Mode
390XOPT200	P25 Conventional Operation Mode
390XOPT300	HPD® Testing Option
390XOPT301	HPD® Advanced Analysis Package

Accessories for 390X

AC25011	Case, Transit W/Wheels
AC25012	Case, Soft Padded Carrying
AC25013	Kit, 10/20 dB Pads, TNC
AC25014	Scope Probe Kit
AC25023	Front/Rear Cover
AC25027	TNC To BNC Adapter
AC25029	Accessory Pouch
AC25036	DC to AC Converter, 12 VDC to 110-120 VAC
AC25042	HF Antenna
AC25043	UHF Antenna
AC25044	800 MHz Antenna
AC25045	VHF Antenna
AC4105	Return Loss Bridge (1.3 GHz)
CALFB390X	Calibration Certificate
AC8645	Microphone

Enhanced Standard Warranty for 390X

W390X/201 Enhanced Standard Warranty

Extended Standard Warranties for 390X

W390X/203 Extended Standard Warranty 36 Months

W390X/205 Extended Standard Warranty 60 months

Extended Standard Warranties with Calibration for 390X

W390X/203C Extended Warranty 36 Months with scheduled calibration

W390X/205C Extended Warranty 60 Months with scheduled calibration

Notes

Maximum span width limited to 5 MHz when in channel analyzer mode.

Option 114 TETRA Energy Economy Mode requires option 110 TETRA MS.

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