IFR-1900 CSA
UWC-136 Digital PCS Radio Test Set

Engineered for maximum performance, the IFR-1900 CSA is an all in one PCS solution for today's dual band/dual mode mobile and base station equipment

- The industry accepted simulator for TIA/EIA-136 conformance testing
- Tri-Band, 400/800 MHz and 1900 MHz PCS test capable
- Comprehensive TIA/EIA-136 conformance testing
- Analog and digital authentication compliance testing option
- TIA/EIA-136 hyperband handoff
- Fully automated remote testing ability with RS-232 or IEEE-488 (GPIB) interfaces
- Intuitive test set up screens for easy "Guided" user testing
- VSELP and ACELP vocoder functions allow verification of voice quality
- Full featured 2 GHz service monitor with spectrum analyzer and tracking generator
- Standard constellation IQ display for quick assessment of digital mobile or base station transmitter modulation

Fully Featured TIA/EIA-136 (TDMA) Test Solution

The IFR-1900 CSA provides you with the industry's only accepted test solution for TIA/EIA-136 analysis, including critical adjacent power measurements and power measurements down to -40 dBm, which allows the user to test the base station without taking it off-line.

It is capable of performing the critical dual-mode analog/digital authentication and protocol compliance tests for TIA/EIA-136 dual mode mobiles.

As for flexibility, the IFR-1900 CSA provides the capability to perform both mobile and base station conformance testing. And with the VSELP and ACELP vocoder technology as standard features, the IFR-1900 CSA can handle today's latest technology.

The IFR-1900 CSA comes with a wide array of application software options. The AC1036 Protocol Conformance Test Software provides an excellent way to verify software conformance of TIA/EIA-136 mobiles. Other applications software supports automated tests for the most widely used base station applications.

AMPS Solutions

Engineered to be a true dual-mode test solution, the IFR-1900 CSA also incorporates AMPS and NAMPS mobile and base station compliance test features.
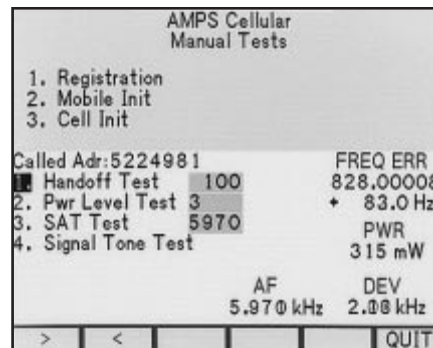
*Full AMPS testing modes are available with the IFR-1900 CSA*

Automatic test routines and user defined print outs enhance manual mode testing for both mobiles and base stations.

Open control channel simulations, voice channel signaling, home/roam condition, home SID, SAT, DSAT, DST, DCC, SINAD reference points, RF power windows, and other AMPS/NAMPS functions and signaling routines allow complete AMPS and NAMPS system testing.

A Full Complement of Service Monitor Functions to 2 GHz.

The IFR-1900 CSA gives you full frequency domain analysis to 2 GHz with a fully featured spectrum analyzer and tracking generator built-in.

The IFR-1900 CSA also offers a full complement of standard service monitor features including a full span digitized oscilloscope to 1 MHz, DVM and SINAD functions, frequency and channel tables, selectable IF filters, and a wide variety of displays.
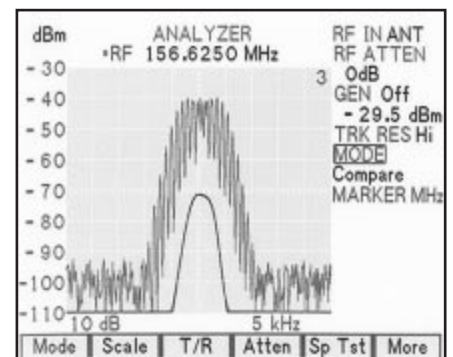
The IFR-1900 CSA gives you full featured service monitor functions

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IFR-1900 CSA

In addition to the 2 GHz RF generator, the IFR-1900 CSA also provides full audio/data generator capabilities, full level control and measurement facilities and precision power control features for enhanced sensitivity and high accuracy testing needs.

Analog paging encoding/decoding, DTMF, tone coded squelch, digital squelch, AM modulation/demodulation along with two separate AF generators and cross band duplex gives added test versatility in a variety of wireless systems.

Software Options Make Complex Testing Simple

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

Our comprehensive portfolio of application software options are designed to automate and expand the functionality of your instrument.

Plus, on-going software support means that you can easily upgrade your IFR-1900 CSA when test and service requirements change.

AC1009W - EasySpan™ is a Windows-based software utility which extracts spectrum analyzer and tracking generator traces from the IFR-1900 CSA.

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.

AC1020D - AutoCell NTD provides automated testing of Northern Telecom cell sites.

AC1021 - CellScan™ cellular utility software simplifies combiner alignment, monitoring RF levels and base stations on DAMPS, NT400 or PCS cellular channel sets.

AC1027 - AutoCell-882/884 is an autotest program for performing acceptance tests on Ericsson 884/882/882D/882M/882DM base stations.
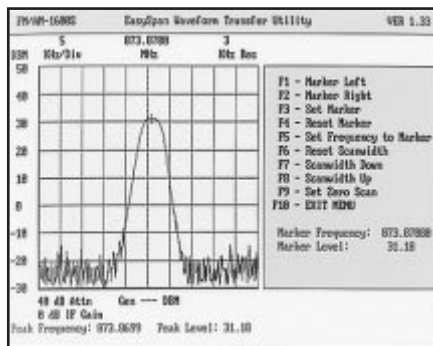
EasySpan Software

Dynamic IQ Constellation Display Simplifies Analysis

The IFR-1900 CSA provides you with a dynamic constellation display for precise RF modulation analysis of DQPSK digitally modulated waveforms from 10 MHz to 2010 MHz. This unique IFR-1900 CSA feature gives a near real time display for testing and troubleshooting, an ability that points out the cause of the trouble in digital radios.
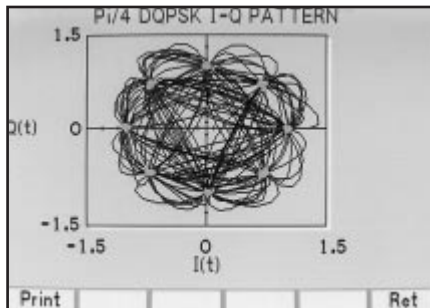
IQ Constellation display allows for comprehensive digital modulation testing

Complex Functionality Made Easy

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

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

Its test macro command programming language (TMAC) can be easily configured to perform automatic base station testing and remote terminal, single and multi-mode, single and multiband equipment. This powerful capability allows you to create and save simple "one button" test routines for future use. This flexibility means you can create and execute complex and repeatable routines no matter what your level of expertise.

A new color VGA display gives IFR-1900 CSA users vivid screen clarity. Extensive use of softkeys reduces your complex cellular / PCS parametric and protocol tests to fast, simple and manageable routines.

Specification

RF Signal Generator

(T/R) AND DUPLEX CONNECTOR

Frequency Range
10 MHz to 2010 MHz

Resolution
100 Hz

Accuracy
Same as Master Oscillator

Range
-127 dBm to + 10 dBm into 50 Ω
(T/R Connector: -30 dBm maximum with reverse power present)

Resolution
0.1 dB

Accuracy
± 1.5 dB (≥-110 dBm)

Duplex Connector Input Protection
Alarm sounds when level exceeds +20 dBm.

Modulation

EXTERNAL

Generator IF Output Frequency Range
88 MHz to 90 MHz

Level Range
-30 dBm to +25 dBm into 50 Ω

Residual FM
<10 Hz RMS

SSB Phase Noise
<-94 dBc/Hz (20 kHz Offset)

Residual AM
<0.3% RMS (50 Hz to 15 kHz BW)

Non-Harmonics
<-50 dBc

Nominal Input Frequency for Generator IF In
90 MHz

Input Level
-26 dBm to +28 dBm into 50 Ω

Signal Bandwidth
8.5 MHz

System Gain
28 dB ± 7dB, from GEN IF Input to T/R Ports

INTERNAL FM

Range
Off and ±100 Hz to ±100 kHz Dev.

Accuracy
± 5% (1 kHz to 20 kHz Dev, 1 kHz rate)
± 10% (1 kHz Dev and >20 kHz Dev, 1 kHz rate)

Resolution
100 Hz

Modulation Rate
1 kHz to 10 kHz - 5% accuracy

Waveforms
Sine, Square, Triangle

INTERNAL PHASE/QUADRATURE (IQ)

RF Ranges
10 MHz to 2010 MHz

IQ Error Vector Magnitude
5% from ideal DQPSK waveform
(TIA/EIA-136)

IQ Origin Offset
<-30 dBc

AF Signal Generators

AF Generators #1 and #2

Range
10 Hz to 40 kHz

Resolution
0.1 Hz ≤2 kHz
1 Hz >2 kHz

Accuracy
±0.1%

Waveshapes
Sinewave, Square, Triangle, Ramp, Pulse

Audio Frequency Counter

Frequency Range
10 Hz to 200 kHz (in 4 decade ranges)

Accuracy
Same as Master Oscillator

Resolution
0.1 Hz (10 Hz to 2 kHz)
1 Hz (>2 kHz to 20 kHz)
10 Hz (>20 kHz to 40 kHz)

Input Waveform
Sine or Square

External Level
0.5 VRMS to 30 VRMS (SINAD/BER input)
0.1 VRMS to 3.5 VRMS (EXT MOD input)

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IFR-1900 CSA

RF Counter

Frequency Range
10 MHz to 2010 MHz

Accuracy
Same as Master Oscillator

Resolution
1 Hz (fc <20 MHz)
10 Hz (fc >20 MHz)

Minimum Level
-60 dBm (ANT connector)

RF Frequency Error Meter

Frequency Digital 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 to ±150 kHz)

Minimum Level
-60 dBm (ANT Input Port)

RF Power Meter

Frequency Range
100 MHz to 2010 MHz

Input Level
0.05 mW to 50 W RMS (<900 MHz, 1–2–5 sequence, 4 decade)
0.05 mW to 10 W RMS (>900 MHz, 1–2–5 sequence, 4 decade)

Resolution
1 %

Accuracy
±6% (>5 W and <50 W, at Typical Operational Ambient Temperature)

LOW LEVEL POWER METER

Frequency Range
Same as standard RF power meter

Input level
-40 dBm to -10 dBm

Accuracy
12% typical

Receiver

Frequency Range
10 MHz to 2010 MHz

Sensitivity
<-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)

Receive IF Output Signal Frequency
88 MHz to 90 MHz

IF Bandwidth
8.5 MHz

FM Deviation Meter

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)

Modulation Rate
100 Hz to 40 kHz

Carrier Range
100 MHz to 2010 MHz

Minimum Carrier Level
-60 dBm (ANT Input Port)

PM Deviation Meter

Deviation Range
0 Rad to 10 Rad (Peak)

Resolution
0.01 Rad (deviation ≤5 Rad)
0.1 Rad (deviation >5 Rad)

Carrier Range
100 MHz to 2010 MHz

Minimum Carrier Level
-60 dBm (ANT Input Port)

AM Modulation Meter

Modulation Range
1 % to 90 %

Resolution
1 %

Accuracy
±5 % of full scale ±1 count + source residual AM
(30 % to 90 %)

Carrier Range
100 MHz to 2010 MHz

Minimum Carrier Level
-60 dBm (ANT Input Port)

Distortion Meter

Distortion Range
0.1 % to 20 %

Resolution
0.1 %

Accuracy
±0.5 % distortion ±1 count (1 % to 10 %)
±2 % distortion ±1 count (>10 %)

Signal Frequency
700 Hz to 1.4 kHz

Signal Level
0.1 VRMS to 30 VRMS (SINAD/BER input)

Error Vector Magnitude (EVM) Meter

Input Range
NT 400 Channels
Cellular 800 MHz Channels
PCS 1900 MHz Channels

Minimum Carrier Level
-60 dBm (ANT connector)

EVM Range
0 to 100 %

EVM Resolution
0.01 %

Meter Residual EVM
<2 % indication

Accuracy
± 3.0% indication, ± 1 LSD + meter residual EVM

SINAD Meter

Range
3 dB to 30 dB

Resolution
0.1 dB

Accuracy
±1 dB ±1 count (at 12 dB SINAD)

Signal Frequency
700 Hz to 1.4 kHz

Signal Level
0.1 VRMS to 30 VRMS (SINAD/BER input)

Digital Multimeter

VOLTMETER (DC/AC)

Ranges
200 mV to 200 V (full scale, decade sequence, 150 Ω, 600 Ω, 1 MΩ selectable)

Maximum Input
1000 VDC
500 VAC

Resolution
3.5 digit (maximum resolution 0.1 mV on 200 mV range)

Accuracy
±5% of full scale ± 1 count (AC, where ACV*kHz < 140)
±1% of full scale ± 1 count (DC)

Frequency
DC, 50 Hz to 20 kHz

Input Impedance
1 MΩ (±5%)
150 Ω (±5%)
600 Ω (±5%)

OHMMETER

Ranges
200 Ω to 20 MΩ (full scale, decade sequence)

Resolution
3.5 digit (maximum resolution 0.1 on 200 range)

Accuracy
±5% or 0.1 (±1 count)

CURRENT METER (DC/AC)

Ranges
20 mA to 2 A (full scale, decade sequence, 20 A maximum when using external shunt)

Resolution
3.5 digit (maximum resolution 0.01 mA on 20 mA range)

Accuracy
±5 % or 0.1 mA ±1 count

Oscilloscope

Vertical BW
1 MHz (-3 dB)

Input Ranges
1 mV / Div to 50 V / Div (1-2-5 sequence, 8 divisions)

Max Input Vertical
200 V Peak

Accuracy Vertical
±5% of full scale
±10% of full scale (1 mV and 2 mV ranges)

Resolution Vertical
Full Scale / 256

Coupling Vertical
AC, DC, GND

Horizontal Sweep Rate
1 μSec / Div to 100 msec / Div (1-2-5 sequence, 10 divisions)

Accuracy Horizontal
±1 % of Full Scale

Resolution Horizontal
Full Scale / 400

External Input Impedance Horizontal
1 MΩ (shunted by 27 pF nominal)

Internal Signal Routing
425 kHz IF
Demod Audio
Function Generator
SINAD/BER
RF Power
EXT MOD

Spectrum Analyzer

Range
10 MHz to 2010 MHz

Frequency Span Range
1 kHz/Div to 100 MHz/Div plus Zero Scan
(10 divisions in a 1-2-5 sequence)

Accuracy
±5% of Span Width

Reference Accuracy
See Master Oscillator

Display
Log, 10 dB/Div and 2 dB/Div

Vertical 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)

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Overall Accuracy
± 4 dB (10 MHz to 400 MHz) (normalized)
± 5 dB (>400 MHz to 2010 MHz) (normalized)
± 2 dB Log Linearity

Input Attenuator
0 dB, 20 dB, 40 dB (User selectable, ANT Input Port)
40 dB, 60 dB, 80 dB, (User selectable Pwr <2 W, T/R Port)
60 dB, 80 dB, l00 dB, (User selectable, Pwr >2 W, T/R Port)

Bit Error Meter (BER)

Range
$1x10^{-1}$ to $1x10^{-5}$

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 and User Defined

Input/Output (I/O)

IEEE 488.1-1987 Internally Assigned GPIB Addresses
System Control Processor (GPIB Address=4)
TDMA Control Processor (GPIB Address=5)

RS-232 (Asynchronous) SCSI-1 External Video Port Operation Mode
VGA Compliant

Frequency Reference Ports
BNC Input for External 10 MHz Sync
BNC Output of Internal 10 MHz Sync

Dedicated Printer Port
25-Pin D-Sub, Centronics Compatible

IQ Output Interface
BNC Connector

TDMA Timeslot Sync
BNC Connector

Master Oscillator

Frequency Standard
10 MHz (Nominal)

Temp Stability
±0.01 ppm (0 to 50℃)

General Characteristics

Dimensions
188 mm (7.4 in) H, 478 mm (18.8 in) W, 635 mm (25 in) D (with bail handle and front panel cover in place)

Weight
Less than 21.8 kg (48 lb)

Operating Temperature Range
0 to 50℃

POWER REQUIREMENTS

Line
105 - 130 to 210 - 260 VAC
50 to 60 Hz @ 200 W Maximum

DISPLAY

Type
Color, Active Matrix LCD

Size
96 mm (3.8 in) wide, 86 mm (3.4 in) high

Resolution
640 pixel x 480 pixels.

Versions & Accessories

When ordering please quote the full ordering number information.

Ordering Numbers	Versions
1900	IFR-1900 CSA Service Monitor
1900-C	IFR-1900 CSA Service Monitor with Certificate of Calibration
	Accessories
AC510	Paging Encoder for Flex, GSC and NEC D3
AC1009W	EasySpan for Windows (Waveform Transfer)
AC1017	AutoCell-Series II (Lucent Series II)
AC1019	EasySweep (Swept Antenna Measurements)
AC1020D	AutoCell-NTD (Northern Telecom Cell Sites)
AC1021	CellScan
AC1027	AutoCell-882/884 (Ericsson)
AC1036	TIA/EIA-136 Conformance Software
AC1048	SSD Update & Authentication Test
AC1201	Telescoping Antenna
AC3403	TMAC Users Manual
AC4103	Return Loss Bridge Kit(5 MHz to 2 GHz) (Includes AC1019)
AC8645	Microphone
AC9153	Soft Padded Carrying Case

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Part no. 46891-028

Revision A