

**FREEDOM**  
Communication Technologies

The World's only truly portable, full-featured  
LMR communications analyzer

## R8000C Communications System Analyzer



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The World's only truly portable,  
full-featured LMR communications analyzer

Freedom Communications Technologies is proud to offer the next generation of the world's leading communications system analyzer: The R8000B delivers a previously unimaginable result: a truly portable instrument with more functions than yesterday's bench top analyzers. And it now offers significantly improved spectral purity, surpassing that of comparably priced and even much more expensive radio test sets.

The R8000's 14 pound weight gives technicians power and flexibility never before attainable - or currently attainable with any other instrument. This, combined with the unit's feature-packed spectrum analyzer, amazing new enhanced tracking generator, and bright 8.4" color LCD, makes it ideal for site infrastructure maintenance and interference measurement.

Firmware upgrades are available free via web download for the life of the unit, and new capabilities are being constantly added - so your R8000C actually becomes more powerful over time!

Software and protocol options can also be added directly from the front panel in less than 30 seconds; so it is clear that the R8000C is the most flexible, robust future-proofed radio test set the industry has ever seen. The R8000C will change the way you perform radio service forever.

**FREEDOM**  
Communication Technologies



# R8000C Communications System Analyzer | A Compact and Lightweight Solution

You no longer need to lug multiple pieces of heavy equipment to perform service at remote locations. The R8000 has everything you need in one compact, 14 lb. package! Among the instruments included in the R8000 are:

- Spectrum Analyzer
- Signal Generator
- Sensitive Measurement Receiver
- High Performance Tracking Generator (optional)
- SINAD Meter
- Distortion Meter
- Modulation Scope
- Oscilloscope
- Frequency Error Meter
- Cable Fault Locator (optional)
- FM Deviation Meter
- AM Modulation Meter
- Receive Signal Strength Meter
- Broadband and Narrowband Power Meters
- Audio Counter
- Audio Generator
- AC / DC Voltmeters
- Return Loss / VSWR bridge (optional)
- DMR (MOTOTRBO™) test mode (optional)
- NXDN test mode (optional)
- TETRA subscriber test mode (optional)
- P25 conventional test mode (optional)
- P25 trunking test mode (optional)
- P25 Phase 2 trunking test mode (optional)



# The Ultimate Radio Test Set

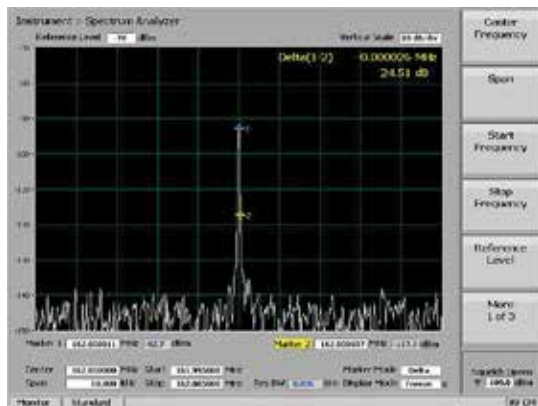
## Superior Spectrum Analyzer

The R8000 comes equipped with a spectrum analyzer comparable to those found on stand-alone instruments costing as much or more. With a noise floor well below -140 dBm at narrow spans, super-fast signal acquisition, 4 markers (2 standard), and an available variable vertical scale down to 1 dB per division, the R8000 is the ideal tool for tracking and measuring elusive interfering signals.

## Upgradable and Expandable

The software-based architecture of the R8000 lets you add software options and upgrades in the field. So if your needs change down the line, simply order the feature or protocol you need and enable it by entering a 16 digit option key using the front panel keypad.

*Firmware upgrades are available on our website free of charge for the life of the unit.*



**Weight:** 14 lbs.

**Frequency Range:** 250 kHz to 3 GHz (1 GHz standard, 3 GHz optional)

**Size:** 9.4" high x 12.7" wide x 7.5" deep

**Display:** 8.4" LCD, visible in sunlight, with wide viewing angle

**Spec. An. Noise Floor:** -120 dBm (-140 dBm at narrow spans)

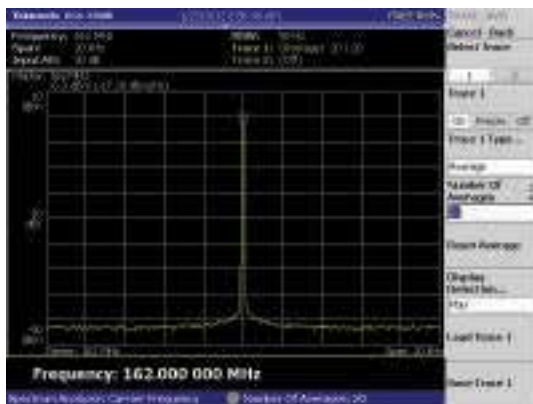
**RF Input:** 50 W 5 Min, 150 W maximum



# The R8000C: Production-Grade Performance, Laboratory-Grade Specifications, Field Portability

## Monitor & Control Interface (M&C) & Low Phase Noise for Automated Test and High Performance applications

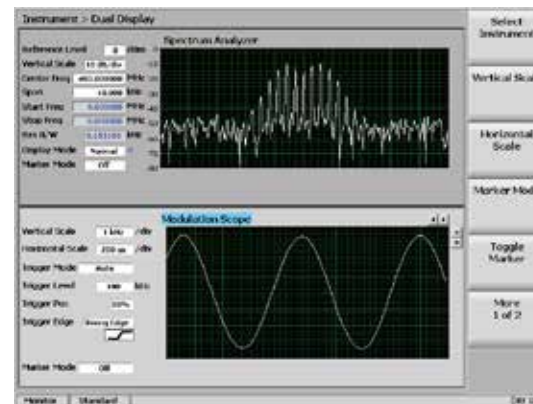
The M&C consists of proprietary commands as well as support of IEEE standard equipment ID query for automating manufacturing test processes and procedures. This, along with the exceptional phase noise performance of the R8000C's signal generator, makes it suitable for manufacturing and other high-performance applications, enabling significant reductions in capital costs. The outstanding purity of the R8000 signal generator can be seen in the spectrum analyzer capture on the right.



Exceptional Phase Noise Performance

## “Dual Display” lets you see carrier signal and demodulated audio simultaneously

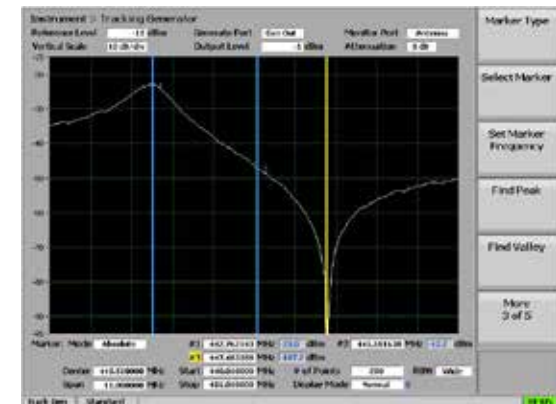
Our unique Dual Display allows you to view the RF spectrum analyzer and modulation scope at the same time, giving you the ability to analyze RF characteristics of the carrier signal and recovered audio from the same screen. Complete functionality of each instrument is available in Dual Display mode, and all associated measurements are displayed. With Dual Display, you no longer need to go back and forth from the spectrum analyzer to the modulation scope to see everything you need – it's all on one screen! Included with the Enhanced Spectrum Analyzer option R8-ESA.



Dual Display

## High Performance Tracking Generator

Our Tracking Generator option provides an integrated instrument that sets up the RF Generator in a sweeping mode that is lock stepped with the Spectrum Analyzer. The tracker's extraordinary dynamic range and response time delivers an invaluable tool for measuring and servicing RF filtering and combining networks like IF filters and Duplexers. The R8000's low Spectrum Analyzer noise floor, FFT processing, and broad selection of display and marker functions assure quick and accurate measurements. Antenna return loss and VSWR measurements can be made with the use of the optional Return Loss Bridge (R8-VSWR).



Tracking Generator

# Comprehensive APCO P25 Phase 1 and Phase 2 Test Capability

The R8000 is the only portable communications analyzer with a comprehensive suite of APCO P25 diagnostics. For both Phase 1 and Phase 2, as well Phase 1 Trunking.

The R8000's P25 test functions are fully compliant with the TIA/EIA-102.CAAA measurement standard and include:

- Bit Error Rate (BER) test patterns
- Error Vector Magnitude (EVM)
- Constellation Display
- Distribution Plot
- Linear Simulcast Modulation (LSM)
- Symbol Deviation
- Modulation Fidelity
- Frequency Error
- Power
- Eye Diagrams

## BER testing

All 10 TIA specified test patterns for P25 radio receivers and all 7 TIA test patterns for radio transmitters are measured: 1011 Hz Tone, O.153, Busy, Calibration, Silence, Idle, AFC, Symbol Rate (Rx only), Low Deviation (Rx only), and C4FM Modulation Fidelity (Rx only).

## P25 signal quality measurements

Modulation Fidelity indicates how far a P25 signal is from ideal theoretical modulation. Symbol Deviation is a convenient signal quality metric. A P25 radio with a perfect C4FM

modulated signal should measure 1800 Hz. Significant variation from 1800 Hz indicates a potential transmitter problem. Frequency Error displays the difference between a P25 transmission carrier and operator-selected monitor frequency.

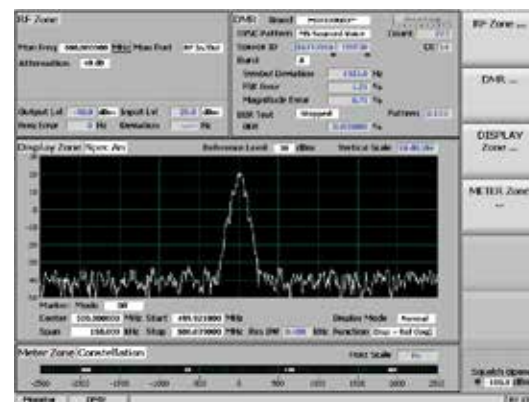
## P25 Phase 1 Trunking

The P25 trunking option enables the R8000 to become a base station emulator and trunking controller. Default Frequency plans for the VHF/UHF, 700 MHz and 800 MHz bands are provided. The user may modify these plans as needed for channel bandwidth, duplex offset and the bands base frequency offering a complete and comprehensive test solution for all P25 trunked systems. Test functions include: Control Channel Idle, Registration Request, Registration Grant, Traffic Channel Request/Grant, Voice Channel audio paths, including encryption if fitted, with Voice Loopback, Incoming call alert tone, and Voice call (1011Hz Tone).

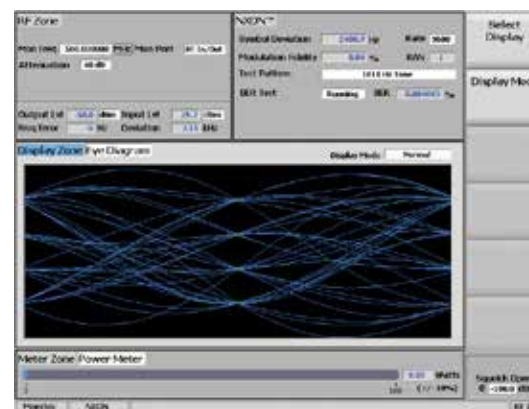
## Patented Voice Loop

The R8000's patented Voice Loop feature (U.S. patent 5703479) allows quick confirmation that P25 audio is being properly encoded and decoded by a subscriber unit. The user simply keys the radio and records up to 10 seconds of

audio. When the radio is unkeyed, the R8000 automatically returns the recorded audio, which can then be heard over the radio's speaker. Recordings can be replayed as many times as needed.



Comprehensive P25 Signal Quality Analysis



P25 Trunking with Eye Diagram

## P25 Phase 2

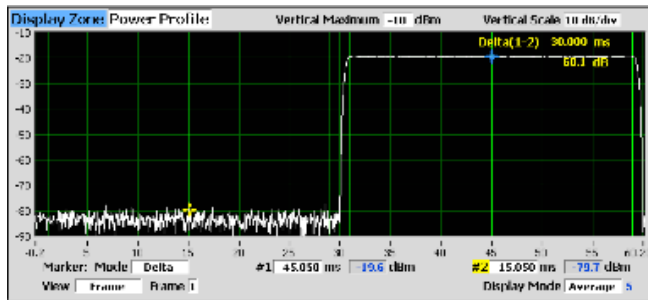
The R8000 offers a suite of test capabilities that are fully compliant with the asymmetrical superframe structure specified by the TIA-102.CCAA measurement standard and support both specified modulation schemes: H-CPM (inbound) and H-DQPSK (outbound).

Measurement functionalities include:

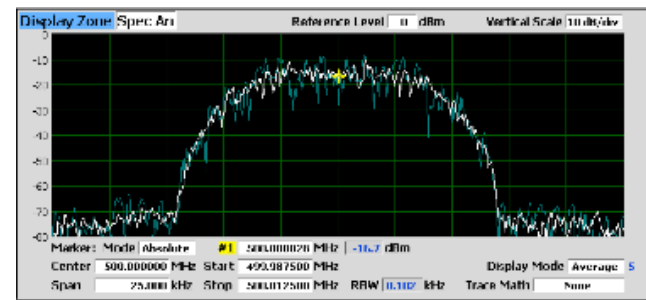
- RF slot power
- Power envelope/timing
- Symbol rate
- Symbol deviation
- Modulation fidelity
- Frequency error
- Frequency deviation
- Bit Error Rate (BER) – 3 patterns
- Test pattern generation – 6 patterns

In addition to this comprehensive set of measurements, the R8000 offers several graphical representations of signal quality, including:

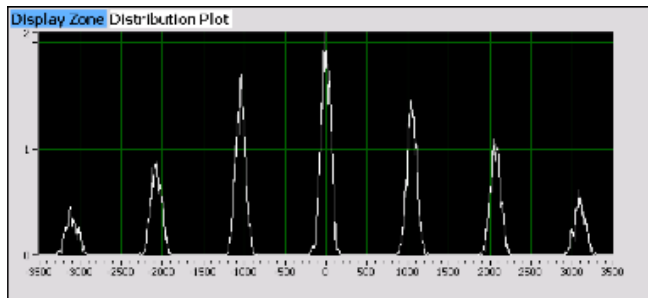
- Eye diagram
- Distribution plot
- Frequency constellation display
- H-CPM Power Profile with Ramp-Up/Down
  - Single Slot (first or second)
  - Two-slot frame
  - Any frame within a superframe



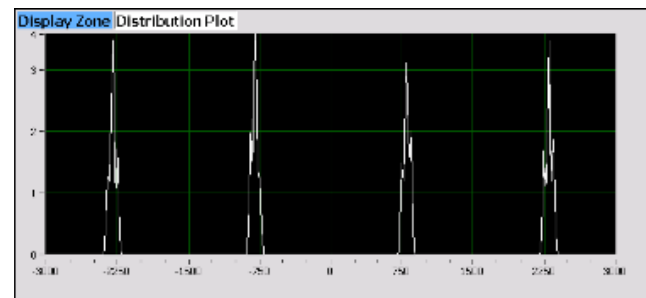
H-CPM Power Profile second slot transmission



H-DQPSK base station transmission



Distribution Plot of H-CPM 1031Hz Tone



Distribution Plot of H-DQPSK 1031Hz Tone



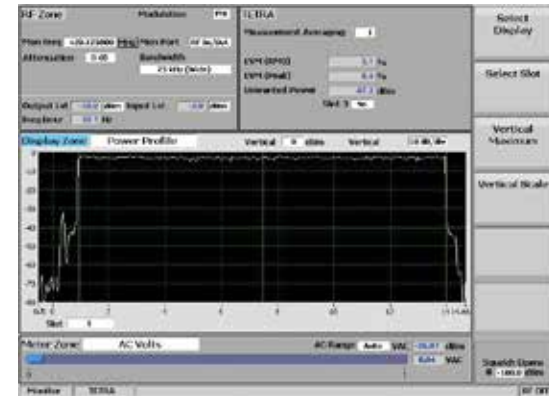
# TETRA

The TETRA option allows quick RF performance testing of TETRA radios with a Direct Mode Operation (DMO) channel. Modulation performance can be evaluated using Error Vector Magnitude (EVM) measurements and viewing a constellation display. Receiver performance can be tested using a 1000Hz test pattern.

Radios can be verified to operate on channel and within timing and power requirements with measurement of:

- Carrier Frequency Offset
- Power Profile
- Unwanted Power
- Modulation Spectrum

The R8000 communications analyzer is the world's only portable full-featured radio test set with the ability to test TETRA, APCO P25 Phase 1 and Phase 2, DMR, NXDN and analog radios across the entire RF spectrum from 250 kHz to 3 GHz!



TETRA Power Profile



1. Bright 8.4" Color LCD with wide viewing angles
2. User-Friendly, softkey driven operation
3. Tuning Knob for quick and easy changes of numeric entries: Digital precision with an analog feel
4. Off-the-air antenna port for sensitive receiver measurements
5. VGA, Ethernet, Key Loader, and additional USB ports
6. One-touch mode keys take you directly to the instrument you need
7. Escape Key returns user to previous screen for easy navigation
8. Hot Keys for quick navigation from screen to screen



# AutoTune™ Automated Radio Test and Alignment

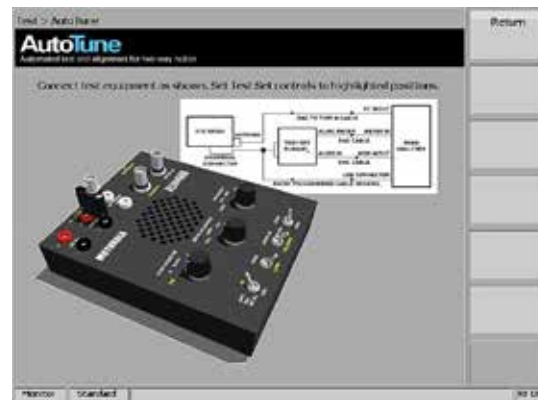
The R8000's AutoTune option performs all recommended factory test and alignment procedures in a fraction of the time needed to perform them manually. Just select your radio model and connect as shown on the R8000, choose the tests and alignments you wish to perform, then enter your operator ID and press the "start button."

## Benefits:

- Test time reduced by over 80%
- Consistent manufacturer specified alignments among radios
- Accurate and repeatable test results
- Comprehensive test reports show before & after readings, time, date and operator identification
- Pass/Fail indicators flag radio defects
- Little or no technical expertise required
- Results are stored on the R8000 and can be exported to a USB drive for analysis with PC spreadsheet software

The R8000 automatically reads key radio information such as model number and serial number, and makes the measurements and alignments needed to bring the radio within factory specifications. Within minutes you have a complete record of your test session stored on the R8000 in comma delimited form for quick and easy recall. Over time you will build a

complete test history for every radio – ideal for large fleets with formal Preventative Maintenance programs. Test reports can be conveniently viewed on the R8000 or exported for further analysis using spreadsheets and other data manipulation programs.



R8000 XTS AutoTune Setup Diagram



MOTOTRBO AutoTune Status Screen

*Reduces radio test and alignment time from an hour or more to 10-12 minutes!*

## Test and Alignments Performed:

### Transmitter Tests

- Bit Error Rate (BER)
- Reference Frequency
- RF Output Power

### Alignments

- Reference Oscillator
- Transmit Deviation Balance
- Transmit Deviation Limit
- Transmit Power Level

### Receiver Test

- Rated Audio
- Distortion
- SINAD Sensitivity
- Noise squelch
- Voice Modulation



XLT5000 AutoTune Test Report

R8000 AutoTune is now available for:

- Motorola TRBO Mobiles & Portables
- Motorola XTL Series Mobiles
- Motorola XTS 1500/2500/5000 Portables
- Motorola APX Mobiles & Portables
- Kenwood NX Series Mobiles & Portables

# R8000 Premier Packages | Coverage Mapping Option



The R8000C PREMIER PACKAGES are the best values in LMR test equipment.

Both packages include the following options:

- **Tracking Generator** - NEW High Performance Tracking Generator - Lightning fast response and wide dynamic range makes this a must for tuning cavities, duplexers and filters.
- **Enhanced Spectrum Analyzer** - Includes our proprietary DualScope display which shows the carrier signal and modulation scope simultaneously
- **Remote Front Panel** - Operates all functions from a networked PC
- **Cable Fault Locator**
- **Soft Carrying Case**

The packages differ only in frequency capability and service coverage. The 3GHz package features operation of all features to 3GHz with a

1 year service plan. The 1GHz package features a 3 year plan.

With the R8000C, you have a test set that is not only state-of-the-art, but state-of-tomorrow's-art. We continue to add capabilities with frequent firmware releases, all of which are available on our web site free for the life of the unit.

And if you find yourself needing an option or protocol you didn't originally obtain? Just order the feature you need, enter the installation key, and in seconds you have your new capability.

*The R8000: The World's Most Future-Proofed Radio Test Set*

## Coverage Mapping

Freedom Communications Technologie now offers a coverage mapping software package for use with its R8000 Communications Systems Analyzer. This new 'Drive-Test' software, developed for the R8000 by Survey Technologies, Inc., is a customized version of the company's successful "Field Test 7" product, widely considered the industry standard for two-way radio system coverage mapping.

The FT7 translates thousands of signal measurements into highly customizable contour plots and critical signal strength data

which can be exported as an Excel file or as comma or tab delimited data files for subsequent analysis. The maps and data files provide baseline information for analysis of two-way radio communication system coverage and performance; new transmission site setup and maintenance. The package includes:

- **STI enhanced 'Field Test 7' Software** - Including "tile analysis" software and indoor measurement capability
- **GPS receiver/antenna**
- **Street map data for the U.S and Canada**
- **R8000 software driver**
- **1 year STI service and support**



Sample Blended Coverage Map

# Specifications

## OPERATING/DISPLAY MODES

AM/FM Monitor	Spectrum Analyzer
AM/FM Generator	Frequency Counter
AM Modulation Meter	Frequency Error Meter
FM Deviation Meter	Digital Voltmeter
Audio Synthesizer	Power Meter
Duplex Generator	Oscilloscope
Tracking Generator (Opt.)	Signal Strength Meter
Dual Display (Opt.)	SINAD/Distortion Meter
Cable Fault Locator (Opt.)	

## GENERAL

<b>Displayed Average Noise Level (DANL):</b>	-140 dBm (50 Ohm input termination)
<b>Dynamic Range:</b>	80 dB
<b>Input Related Spurious:</b>	-60 dBc max
<b>Residual Spurious (non-input related):</b>	-70 dBm

### POWER

<b>DC Power Requirements:</b>	24 VDC @ 5.0 A max
<b>AC Adapter Specs:</b>	100-240 VAC, 2.5 A max, 50-60 Hz
<b>Battery Power:</b>	Optional External Battery
<b>Battery Operation:</b>	1 hour minimum

### MECHANICAL / ENVIRONMENTAL

<b>Weight:</b>	<14 lbs (6.4 kg)
<b>Dimensions:</b>	9.4" (23.9 cm) H, 12.7" (32.3 cm) W, 7.5" (19.1 cm) D
<b>Operating Altitude:</b>	Up to 10,000 ft (3048 m)
<b>Humidity:</b>	80% maximum relative humidity
<b>Operating Temperature:</b>	0 to 50°C
<b>Storage Temperature:</b>	-30° to +80° C

### WARRANTY

<b>Standard Warranty:</b>	Two years
<b>Three Year Service Plan:</b>	Optional
<b>Five Year Service Plan:</b>	Optional

## GENERATOR (Receiver Test)

<b>Port Protection Limit:</b>	5W for 30 seconds
<b>Frequency Range:</b>	1 MHz to 1 GHz (250 kHz to 1 GHz typical); Optional to 3 GHz
<b>Extended Frequency Range (Optional):</b>	1 MHz to 3 GHz (250 kHz to 3 GHz typical)
<b>Frequency Resolution:</b>	1 Hz

### OUTPUT LEVEL GENERATE PORT

<b>Range FM:</b>	+5 dBm to -95 dBm below 2 GHz -5 dBm to -95 dBm above 2 GHz
<b>Range AM:</b>	-1 dBm to -95 dBm below 2 GHz -11 dBm to -95 dBm above 2 GHz
<b>Resolution:</b>	0.1 dB
<b>Accuracy:</b>	±2 dB

## GENERATOR (Receiver Test) (Cont.)

### OUTPUT LEVEL RF I/O PORT

<b>Range FM:</b>	-30 dBm to -130 dBm below 2 GHz -40 dBm to -130 dBm above 2 GHz
<b>Range AM:</b>	-36 dBm to -130 dBm below 2 GHz -46 dBm to -130 dBm above 2 GHz
<b>Resolution:</b>	0.1 dB
<b>Accuracy:</b>	±1 dB to 1 GHz; ±2 dB > 1 GHz

### SPECTRAL PURITY

<b>Harmonic Spurious:</b>	-20 dBc max
<b>Non-Harmonic Spurious:</b>	-35 dBc max
<b>Residual FM:</b>	4 Hz, 300 Hz to 3 kHz (< 1 GHz) 5 Hz, 300 Hz to 3 kHz (> 1 GHz)
<b>Residual AM:</b>	1.0% max, 300 Hz to 3 kHz
<b>SSB Phase Noise (20 kHz Offset):</b>	-95 dBc/Hz max below 1 GHz (15° to 35° C) -93 dBc/Hz max all frequencies (0° to 50° C)

### FM MODULATION

<b>Deviation Accuracy:</b>	5% of setting
<b>Deviation Range:</b>	0 to 75 kHz
<b>Deviation Resolution:</b>	10 Hz
<b>Modulation Bandwidth:</b>	5 Hz to 20 kHz

### AM MODULATION

<b>AM Depth Range:</b>	0 to 90%
<b>Resolution:</b>	1% of setting
<b>Modulation Bandwidth:</b>	100 Hz to 10 kHz
<b>Accuracy:</b>	5% of setting

### MODULATION TYPES

1 kHz Tone, Private Line, Digital Private Line (w/ DPL Invert), Single Tone, DTMF, Two-Tone Paging, 5/6 Tone Paging, POCSSAG, External Inputs from both a supplied microphone and BNC input.

## RECEIVER (Transmitter Test)

**Frequency Range:** 250 kHz – 1 GHz (3 GHz optional)

### SENSITIVITY Narrowband FM:

<b>Wideband FM:</b>	2.0 uV for 10 dB EIA SINAD
<b>AM:</b>	10 uV for 10 dB EIA SINAD 10 uV for 10 dB EIA SINAD

### RF I/O PORT

<b>VSWR:</b>	< 1.2 to 2 GHz, ≤ 1.5 to 3 GHz
<b>Max Power:</b>	50 W for 5 minutes 150 W for 30 seconds (30 sec. on, 5 min. off)
<b>Absolute Max Power:</b>	150 W
<b>Alarm:</b>	Internal temperature alarm

## RECEIVER (Transmitter Test) (Cont.)

<b>ANTENNA PORT</b>	
<b>Maximum Power:</b>	0 dBm
<b>Alarm:</b>	+10 dBm

**IF FILTERS:** 6.25 kHz, 12.5 kHz, 25 kHz, 50 kHz, 100 kHz, 200 kHz

### FREQUENCY ERROR MEASUREMENT

<b>Type of Display:</b>	Autorangeing
<b>Resolution:</b>	1 Hz

### FM DEVIATION MEASUREMENT

<b>Demodulation Range:</b>	Up to ±75 kHz
<b>Accuracy:</b>	±5% plus residual FM
<b>Frequency Response:</b>	Selectable per the following: Low Pass Filters: 300 Hz, 3 kHz, 20 kHz High Pass Filters: 1 Hz, 300 Hz, 3 kHz

### Demodulation Output Level:

<b>Demodulation Output Level:</b>	6.25 kHz B/W: 2.56V / 1 kHz 12.5 kHz B/W: 1.28V / 1 kHz 25 kHz B/W: 0.64V / 1 kHz 50 kHz B/W: 0.32V / 1 kHz 100 kHz B/W: 1.6V / 10 kHz 200 kHz B/W: 0.8V / 10 kHz
<b>Demodulation Output Amplitude Flatness:</b>	±0.2dB (300Hz to 3kHz), 1dB point @ 20 kHz
<b>Demodulation Output Impedance:</b>	100 ohms nominal
<b>De-emphasis:</b>	750 mS (selectable)

### STRENGTH LEVEL METER

**Frequency Range:** 250 kHz – 1 GHz (3 GHz optional)

### AM MODULATION MEASUREMENTS

<b>Demodulation Range:</b>	0 to 100%
<b>Accuracy:</b>	±5% for levels below 80%
<b>Frequency Response:</b>	Selectable per the following: Low Pass Filters: 300 Hz, 3 kHz, 20 kHz High Pass Filters: 1 Hz, 300 Hz, 3 kHz

### Demodulation Output Level:

<b>Demodulation Output Level:</b>	0.8 V peak per 10% AM Modulation
<b>Demodulation Output Amplitude Flatness:</b>	±0.2 dB (300 Hz to 3 kHz), 1 dB point @ 20 kHz
<b>Output Impedance:</b>	100 ohms nominal

### RECEIVE SIGNAL STRENGTH LEVEL METER

<b>Frequency Range:</b>	1 MHz to 1 GHz (250 kHz to 1 GHz typical); Optional to 3 GHz
<b>Accuracy:</b>	±2 dB
<b>Sensitivity:</b>	-120 dBm (Antenna Port; Preamp on; 6.25 kHz IF BW)

## RECEIVER (Transmitter Test)

### BROADBAND POWER

#### METER (RF In/Out Port)

**Frequency Range:** 1 MHz to 1 GHz (250 kHz to 1 GHz typical); Optional to 3 GHz  
**Measurement Range:** 0.1 W to 150 W  
**Input Impedance:** 50 Ohms  
**Accuracy:**  $\pm 10\%$  (250 kHz - 1 GHz);  
**Protection:** Over temp alarms

### FREQUENCY COUNTER

**Frequency Range:** 5 Hz to 100 kHz  
**Period Counter Range:** 5 Hz to 20 kHz  
**Input Level:** 0.1 V rms min

### SINAD METER

**Accuracy:**  $\pm 1$  dB @ 12 dB SINAD  
**Input Level:** 0.1 V rms min

### DISTORTION METER

**Range:** 1% to 20%  
**Distortion Accuracy:** The greater of:  
 $\pm 0.5\%$  of distortion or  
 $\pm 10\%$  of reading  
**Input Level:** 0.1 V rms min

### OPTIONAL DIGITAL

#### DEMODULATION

**MODES** DMR (MOTOTRBO™), NXDN Type - C Trunk,  
P25 Phase I Trunk, P25 Phase II, TETRA, PTC (ITCR)

## SPECTRUM ANALYZER

### SWEEP

**Frequency Range:** 1 MHz to 1 GHz (250 kHz to 1 GHz typical); Optional to 3 GHz  
**Frequency Resolution:** 1 Hz  
**Span Accuracy:** 5%  
**Update Rate:** ~10 times per second  
(depending on span)

### AMPLITUDE

**Level Accuracy:**  $\pm 2$  dB  
**Scales (dB/div):** 10(1, 2, & 5w/ESAoption)  
**Log Linearity Accuracy:**  $< 0.1$  dB  
**Reference Level**  
**Resolution:** 1 dB  
**Reference**  
**Level Range:** +60 to -70 dB  
**Antenna Port Dynamic Range:** 80 dB  
**T/R Port Dynamic Range:** 80 dB  
**Typical Noise Floor**  
**Performance:** -140 dBm  
**SSB Phase Noise**  
**(20 kHz Offset):** -95 dBc/Hz max below 1 GHz (15° to 35° C)  
-93 dBc/Hz max all frequencies (0° to 50° C)

**Resolution Bandwidth** Auto Selected (26 Hz to 16.5 MHz depending on selected frequency span)

## SPECTRUM ANALYZER (Cont.)

### Harmonic Spurious

**(Antenna Port, No Attenuation):** -20 dBc max

### Non-Harmonic Spurious

**(Antenna Port, No Attenuation):** -60 dBc max

### Residual Spurious

**(Input Terminated):** -70 dBm

**Markers:** Delta, Absolute Level, and Frequency

**Modes:** Standard, Average, Freeze, Max Hold, and Peak Hold

## OSCILLOSCOPE

### VERTICAL INPUT

**Input Impedance:** 1 Meg Ohm / 600 Ohm (Selectable)

**Range:**  $\pm 100$  VDC,  $\pm 70$  Vrms AC

**Accuracy:** 5% of full scale

**Bandwidth:** 0 to 50 kHz

### HORIZONTAL SWEEP

**Range:** 20  $\mu$ Sec to 1 Sec / div. (Selectable)

### TRIGGER SELECTION

Normal, Auto (Free Running), Single Sweep

### SPECIAL FUNCTIONS

**Markers:** Delta Voltage, Delta Frequency, Delta Period



## AUDIO MODULATION SYNTHESIZER

**Modulation Types:** 1 kHz tone, Private Line, Digital Private Line (w/ DPL Invert), Single Tone, DTMF, Two-Tone Paging, 5/6 Tone Paging, POCSAG, A&B Independent Synths., EURO Tones, User Defined Tone Sequences, and External inputs from both a supplied micro-phone and BNC input.

**Modulation Output Level:** Programmable to  $\pm 8$  V peak  
**Amplitude Flatness:**  $\pm 0.2$  dB (300 Hz to 3 kHz), 1 dB point @ 20 kHz  
**1 kHz Tone Distortion:** Not to exceed 1% THD  
**Impedance:** 100 Ohms

### External Modulation Input

**Level:**  $\pm 1$  V peak reference  
**Amplitude Flatness:**  $\pm 0.2$  dB (300 Hz to 3 kHz), 1 dB point @ 20 kHz  
**Impedance:** 600 Ohms

### External Microphone Input

**Amplitude Flatness:**  $\pm 0.2$  dB (300 Hz to 3 kHz), 1 dB point @ 20 kHz

## TRACKING GENERATOR

**Frequency Range:** 250 kHz - 1GHz (3 GHz optional)

## DIGITAL VOLTMETER (DVM)

**Input Impedance:** 1 Meg Ohm / 600 Ohm (Selectable)  
**Voltage Range:** 1V, 10V, 70V full scale  
**Frequency Range:** 50Hz to 20kHz  
**DC Accuracy:** 1% full scale  $\pm 1$  LSB  
**AC Accuracy:** 5% full scale  $\pm 1$  LSB

## TIMEBASE

**Output Frequency:** 10 MHz  
**Stability:** Aging:  $\pm 0.1$  ppm / year  
Temp.:  $\pm 0.01$  ppm  
**Output Level:** Minimum 0 dBm into 50 Ohms  
**Warm Up:** 3 minutes: within  $\pm 0.1$  ppm

## DISPLAY

### FRONT PANEL DISPLAY

**Resolution:** 800 x 600  
**Size:** 8.4" (21.3 cm) Full Color LCD

**EXTERNAL DISPLAY** VGA

## REMOTE INTERFACE (Optional Feature)

**Remote Front Panel** Available over Ethernet



# Ordering Information

Model	Description
R8000C	Communications System Analyzer, 1 GHz
R8000C-1GHz Premier	1 GHz Premier Package, w/ highlighted options
R8000C-3GHz Premier	3 GHz Premier Package, w/ highlighted options

## Options & Accessories

Part Number	Description	R8000C	R8000C-1GHz Premier	R8000C-3GHz Premier
R8-Remote	Remote Front Panel	OPTIONAL	✓	✓
R8-TG	Tracking Generator	OPTIONAL	✓	✓
R8-ESA	Enhanced Spectrum Analyzer	OPTIONAL	✓	✓
R8-CF	Cable Fault Locator	OPTIONAL	✓	✓
R8-SC	Soft Carry Case	OPTIONAL	✓	✓
R8-3G	3 GHz Operation	OPTIONAL	OPTIONAL	✓
R8-3Y	Three Year Service Plan	OPTIONAL	✓	OPTIONAL
R8-5Y	Five Year Service Plan	OPTIONAL	OPTIONAL	OPTIONAL
R8-DMR	DMR (MOTOTRBO™) Test	OPTIONAL	OPTIONAL	OPTIONAL
R8-DPMR	dPMR Test	OPTIONAL	OPTIONAL	OPTIONAL
R8-AT_TRBO	AutoTune for MOTOTRBO Mobiles and Portables	OPTIONAL	OPTIONAL	OPTIONAL
R8-NXDN	NXDN Test	OPTIONAL	OPTIONAL	OPTIONAL
R8-NXDNTYPC	NXDN "Type C" Trunking Test (Requires R8-NXDN)	OPTIONAL	OPTIONAL	OPTIONAL
R8-P25	APCO Project 25	OPTIONAL	OPTIONAL	OPTIONAL
R8-P25TRNK	APCO Project 25 Trunking Test (Requires R8-P25)	OPTIONAL	OPTIONAL	OPTIONAL
R8-P25-II	APCO P25 Phase II	OPTIONAL	OPTIONAL	OPTIONAL
R8-TETRA	TETRA Subscriber Test	OPTIONAL	OPTIONAL	OPTIONAL
R8-AT_XTL	AutoTune for Motorola XTL Series Mobile Radios	OPTIONAL	OPTIONAL	OPTIONAL
R8-AT_KWNX	AutoTune for Kenwood NX Series Radios	OPTIONAL	OPTIONAL	OPTIONAL
202161-01	Audio Breakout Box for XTL Radios	OPTIONAL	OPTIONAL	OPTIONAL
R8-AT_XTS	AutoTune for Motorola XTS2500/XTS5000 Portable Radios	OPTIONAL	OPTIONAL	OPTIONAL
R8-AT_APX	AutoTune for Motorola APX Mobiles and Portables	OPTIONAL	OPTIONAL	OPTIONAL
R8-HC	Protective "Glove Case"	OPTIONAL	OPTIONAL	OPTIONAL
R8-TC	Transit Case with Foam Molding for R8000	OPTIONAL	OPTIONAL	OPTIONAL
R8-TSC	Transit Case with Foam Molding for Soft Carry Case R8-SC	OPTIONAL	OPTIONAL	OPTIONAL
202907-01	Li-Ion Battery Kit, 24V	OPTIONAL	OPTIONAL	OPTIONAL
202908-01	Li-Ion Battery Kit, 24V, CE & C-Tick Approved	OPTIONAL	OPTIONAL	OPTIONAL
01-80302E82	Isolation Transformer for Baseband Output (600 Ω)	OPTIONAL	OPTIONAL	OPTIONAL
01-80302E83	Isolation Transformer for Meter Input (600 Ω)	OPTIONAL	OPTIONAL	OPTIONAL
R8-VSWR	Antenna Return Loss Bridge Kit	OPTIONAL	OPTIONAL	OPTIONAL
R8-FT7	"Field Test 7" Coverage Mapping Package	OPTIONAL	OPTIONAL	OPTIONAL

✓ = Included



Accessories included with every unit:

- Antenna
- Microphone
- Oscilloscope Probe
- Power Cord
- Users manual CD
- 24V to 12V Converter

Additional accessories sold separately:



R8-HC Protective Glove Case



R8-VSWR Bridge Kit

# R8000 Series Communications System Analyzers

Service, maintenance  
and technical support

For support on Freedom Communication Technologies test equipment contact:

## United States:

Freedom Communication Technologies

2002 Synergy Blvd, Suite 200, Kilgore, Texas 75662

Toll Free Phone: (844)-90-FREEDOM or (844)-903-7333

Phone: 903-985-8999 Fax: 903-985-8998 Email: sales@freedomcte.com

Please visit our web site at [www.freedomcte.com](http://www.freedomcte.com)

## Canada:

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## Australia and New Zealand:

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10 Wesley Court

Tally Ho Business Park

East Burwood, VIC 3151

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## Asia and the Pacific Rim (excluding Japan), Europe, Latin America, Middle East, and Africa:

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# ***FREEDOM***

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