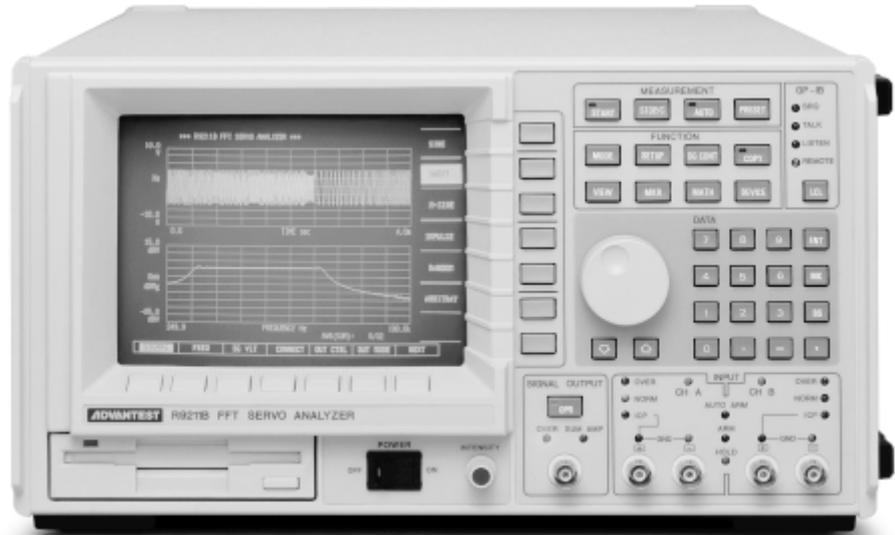


# Digital Spectrum Analyzers

Choice of 4 Types To Fit the Application

## R9211 Series

- 2-Channel, 16-Bit Resolution, Wide Dynamic Range of 90 dB (Typical Value)
- Maximum Input Sensitivity of -140 dBV (2 kHz Range, Typical Value)
- 10 mHz to 100 kHz Frequency Range (1-2-5 Steps)
- Domain Method (Measurement Domain Mode) For Ease of Operation
- Portable With Large 8 Inch CRT Screen
- Frequency Analysis Resolution of 25 to 3200 Lines
- Built-In Power Supply For Measurement of Accelerometers



(Photo is R9211B)

## R9211A/9211B/9211C/9211E FFT Analyzer Series

R9211 Series are portable high performance digital spectrum analyzers which gather the essence of ADVANTEST's accumulated technologies such as usage of dedicated LSI circuits and high density mounting technology as well as development of circuits with low power consumption.

The R9211 Series consists of 4 types so that the best choice can be made to suit the application. These types are the economical R9211E; the R9211A capable of running zoom; the R9211B ideal for servo analysis; and the R9211C which can do servo analysis as well as curve fitting and frequency response function synthesis.

All these types have the wide measurement frequency range of 10 mHz to 100 kHz, a high 16-bit resolution and a wide dynamic range of 90 dB (typical value). The series also has high sensitivity input of -140 dBV (typical value, 2 kHz range) and a function which allows variation of the frequency resolution from 25 to 3200 lines. These features are effective in isolated measurement of micro-level signals and adjacent spectrum. Of course, the series offers more than just these excellent functions. By means of ADVANTEST's exclusive systematized domain method (measurement domain mode), measuring time has been shortened over conventional FFT analyzers and operation simplified for a wide range of user applications.

Other features include an increased memory capacity, built-in floppy disk drive and 16-bit direct digital input analysis which are available as standard (optional for some models). These features meet a wide range of applications.

### ■ Wide Measuring Frequency Range of 10 mHz to 100 kHz

By using high precision analog and digital filters, aliasing filters can be set in all frequency ranges from 10 mHz to 100 kHz. Frequency resolution can also be set from 25 to 3200 lines in all frequency ranges according to the purpose of the analysis. The scale function can be used to display the spectrum of only the required frequency band on the CRT.

### ■ 16-Bit Resolution, 90 dB (Typical Value) Wide Dynamic Range

90 dB (typical value) wide dynamic range spectrum measurement has been made possible through ADVANTEST's advanced analog/digital signal processing technology. In order to take full advantage of the functions of the built-in A/D converter, the input sensitivity range can be varied in 1 dB steps. This is a powerful feature for use in measurements of mechanical characteristics of magnetic optical disks, distortion analysis or transient signal analysis of audio signals and transfer function measurement using an impulse hammer.

### ■ High Sensitivity Measurement of -140 dBV (Typical Value)

When used with a difference input, the R9211 Series attains highly sensitive measurement of -140 dBV (at 0.1  $\mu$ V, 2 kHz (typ.) range). This is effective for analysis of noise in semiconductors or other devices.

#### ■ Portable, With a Large 8 Inch CRT Screen

The R9211 Series are portable, conveniently carried units that can provide high performance measurement results anytime, anywhere. Priority has been given to ease of operation in the design. The wide 8 inch CRT uses an amber display for ease when viewing analysis data. Measurement functions can be selected simply by using the software menu format.

#### ■ 'I/O + Memory' Function Allows Direct 16-Bit Digital Input

The 'I/O + Memory' function is effective in evaluating A/D converters or DSPs used in digital audio equipment such as DAT and CD players. Spectrum or distortion analysis can be done by inputting a digital signal directly after the A/D converter of the R9211 Series in '16-bit + EOC' (twos complement) data format.

#### ■ A Wide Variety of Marker Analysis and Display Functions

The R9211 Series has a wide variety of marker analysis functions which are effective for analysing or making evaluations and allowing for a reduction in measurement time. These include a peak marker, next peak marker, harmonics marker, band marker, overall power, attenuation power, partial power, average power, dispersion and X dB marker. The series has been made easier to use, offering simultaneous display of 1 to 4 screens, overlapping display in the same domain or same analysis range and 3-D display of up to 50 lines. There is also a bar display function where the state of one of overall power, partial power, average power or power dispersion can be checked at a glance.

#### ■ Measurement Domain Modes For Various Measurement Domains

Since digital spectrum analyzers have many measurement applications, there is a tendency for them to have many analysis functions and for their operations to become complicated. In order to free the user from such complicated operations, the R9211 Series has separate measurement domain modes according to the measurement application. The user can select

the desired measurement mode without having to trouble with unused analysis functions or setting conditions. The sought-after results can be obtained easily by making only the software key settings necessary for the measurement.

#### • Waveform Measurement Mode

By using this mode, time domain signal analysis can be done more quickly than was possible previously. Further, an anti-aliasing filter can be turned on and off so that the series can be used as a 16-bit/ 256 kHz sampling oscilloscope. This is ideal for time domain transient phenomenon analysis of the sound of acoustic instruments, starting characteristics tests of engines or motors, waveform analysis of power on reset signals or differential linearity tests of D/A converters.

#### • Time/Frequency Analysis Mode

In evaluation of musical instruments' sound or hall reverberation characteristics, time variation analysis can be done which focuses on a specified spectrum. Further, analysis can be done of the time characteristics of spectrum variations in the wow and flutter component of VCRs or other equipment (frequency monitor function). The time characteristics of phase variations such as jitter can also be analyzed (phase monitor function).

#### • Spectrum Measurement Mode

Measurement is possible with a wide dynamic range of 90 dB (typ.) and high sensitivity of -140 dBV (typ., at a 2 kHz range). This is effective in harmonic distortion analysis and micro-level noise analysis.

#### • Frequency Response Function Measurement Mode

In this mode, frequency resolution can be varied from 25 to 800 lines. Also, since 2 power supply channels for acceleration sensors are built-in, direct measurements of transfer functions of structural components are possible by connection of a sensor with a built-in amp or an impulse hammer.

#### • Servo Analysis Mode (R9211B, R9211C)

The R9211 Series features a built-in summation amplifier for open loop characteristics evaluation, servo measurement with up to a 5 decade log sweep and a point servo measurement function with a frequency table of only specified frequencies.

	Functions and Options											Applications																		
	Curve fitting and synthesizer function	GO-NO GO decisions by comparator function	Running zoom with 10 mHz resolution	SG with digital signal generation	SG with built-in summation amplifier	Power supply for acceleration sensor with built-in amp	SG with output up to ±15 V	Sign, multi-sign, swept sign, impulse, random or arbitrary waveform output	Difference input	Floppy disk drive	High speed thermal printer	CMOS memory (1M words)	'I/O + memory' card	High speed calculation processor	Oscillation/structural components analysis	Acoustics/noise/sound analysis	Digital audio sound output evaluations	Device noise evaluations	Optical disk mechanical characteristics evaluations	Telephone line terminal equipment evaluations	A/D, D/A converter evaluations	Evaluations of servos in CDD/DAT/video disk players	Digital servo evaluations	Digital amp/digital filter evaluations	1/1 and 1/3 octave analysis	High speed octave analysis	Analysis by frequency response function synthesis	Transient signal characteristics (indoor, in-car acoustic analysis)	Analog servo evaluations	130 dB wide dynamic range servo analysis
R9211B				●	●	●	●	●	●	●	Opt.	Opt.	Opt.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
R9211C	●	●	●	●	●	●	●	●	●	●	Opt.	Opt.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
R9211E						●			●	▲	Opt.	▲	▲	●	●	●	●	●	●	●				●						
R9211A			●			●			●	●	Opt.	Opt.	Opt.	●	●	●	●	●	●	●				●	Opt.	●				

Note: Selection of only one possible of the items marked with ▲.

# Digital Spectrum Analyzers

*Choice of 4 Types To Fit the Application*

## R9211E/9211A (Continued From Previous Page)



### R9211E Digital Spectrum Analyzer

The R9211E is an economical model suited for acoustic, oscillation, noise or other signal analysis. It uses a systematized 4 independent domain method (4 measurement domain modes) for a wide range of user applications.

The user can choose from among these 4 measurement domain modes depending on whether the purpose of the analysis is waveform measurement, spectrum measurement, time/frequency measurement analysis or frequency response function measurement. This system allows faster measuring and more simple operation than with conventional FFT analyzers.

Optional features include an increased memory capacity, built-in floppy disk drive and 16-bit direct digital input analysis to meet a wide range of applications.

- 2-Channel, 16-Bit Resolution, Wide Dynamic Range Of 90 dB (Typical Value)
- Frequency Range Of 10 mHz to 100 kHz (1-2-5 Steps)
- Maximum Input Sensitivity Of -140 dBV (2 kHz Range, Typical Value)
- Improved Ease Of Operation Through 4-Domain Method
- 3.5 Inch Floppy Disk Drive Can Be Built-In Optionally
- High Speed Thermal Printer Can Be Built-In Optionally
- Optional 16-Bit Direct Digital Input Analysis
- Optional Memory Upgrade To 1 M Words Available

### R9211A Digital Spectrum Analyzer

The R9211A has a running zoom function with a minimum span of 10 mHz, ideal for sound or noise spectrum analysis. Like the R9211E, the R9211A uses a systematized 4 independent domain method (4 measurement domain modes) for a wide range of user applications.

These 4 domain modes are for waveform measurement, spectrum measurement, time/frequency measurement analysis or frequency response function measurement, allowing rapid measurement and simple operation.

An MS-DOS format floppy disk drive which can be written is provided as standard, memory capacity upgrade and 16-bit direct digital input analysis are available as options.

- Running Zoom Function With Minimum Span Of 10 mHz (<10 kHz)
- 2-Channel, 16-Bit Resolution, 90 dB (Typ.) Wide Dynamic Range
- Maximum Input Sensitivity Of -140 dBV (2 kHz Range, Typ.)
- 1/3, 1/1 Octave Analysis With A, B, C Weighting Built-In
- 3.5 Inch Floppy Disk Drive Provided Standard
- Optional Built-In High Speed Thermal Printer
- Optional 16-Bit Direct Digital Input
- Optional Memory Upgrade To 1 M Words



Used by Japanese Defense Agency

## R9211B FFT Servo Analyzer

The R9211B has a signal generator and is ideal for component oscillation analysis or measurement of servo circuits. It continues the servo measurement know-how employed in previous models, using ADVANTEST's exclusive SSS (Swept Sine Sweep) technique. It realizes a maximum amplitude difference of  $\pm 0.1$  dB between channels and maximum phase difference of  $\pm 1.0^\circ$  between channels.

It has a built-in summation amplifier for use in open loop characteristics evaluations; low SG output impedance; and a servo measurement function using a log frequency table, making it ideal for use in servo design and development. There has been a great improvement in operability and reduction in measurement time over previous models. There is an optional digital signal generator output and a feature allowing analysis by digital input. Also, new applications and the servo analysis mode have been added so that measurement can be done in 5 domains.

- Up To 800 Line Linear Frequency Resolution and Up To 6 Decade Log Sweep
- Log Frequency Table Sweep Enables High Resolution, Wide Dynamic Range Measuring
- New Internal Linear/Log Multi-Sign Sweep Signal
- Internal Summation Amplifier Useful For Open Loop Measurements
- Marker Functions For Easy Finding of Gain Margin/Phase Margin, Peak Gain/Bandwidth
- Calculation Functions Such As Open Loop  $\rightarrow$  Closed Loop Conversion, Closed Loop  $\rightarrow$  Open Loop Conversion
- Coherence Function For Evaluating Reliability of Measurement Results

## R9211C FFT Servo Analyzer

The R9211C is a 2-channel, 16-bit FFT analyzer with ADVANTEST's exclusive servo analysis functions. Using the built-in signal generator, LIN/LOG sign and multi-sign signals sweep, it enables frequency response function measurement. Leakage error is eliminated due especially to ADVANTEST's exclusively developed BMS (Band Multi-Sign) sweep signal which is a step more advanced than the previous SSS technique (Swept Sine Sweep), allowing high speed servo measurement. Further, for measurement requiring improved low-range frequency resolution or wide measurement dynamic range, measurement by log frequency table is a powerful method. Especially by using the servo measurement function, curve fit and synthesis function, servo system design, simulation and performance evaluation can be done rapidly.

- High Speed/High Precision Curve Fit Function and Synthesis Function
- GO-NO GO Decisions Using Comparator Function
- Up To 800 Line Linear Frequency Resolution and Up To 6 Decade Log Sweep Measurement
- High Resolution, Wide Dynamic Range Measurements Possible With Log Frequency Table Sweep
- New Built-In Linear/Log Multi-Sign Sweep Signal
- Internal Summation Amplifier Useful For Open Loop Measurement
- Marker Functions For Easy Finding of Gain Margin/Phase Margin, Peak Gain/Bandwidth
- Calculation Functions Such As Open Loop  $\rightarrow$  Closed Loop Conversion, Closed Loop  $\rightarrow$  Open Loop Conversion
- Coherence Function For Evaluating Reliability Of Measurement Results

# Digital Spectrum Analyzers

Choice of 4 Types, To Fit the Application

## R9211Series (Continued From Previous Page)

### Specifications

#### Input and Analysis Characteristics

**Number of input channels:** 2

**Input format:** Difference input format, signal ended format

**Input impedance:** Approx. 1 M $\Omega$ /100 pF (at signal ended)

**Input coupling:** AC, DC, GND

**A/D converter resolution:** 16 bits

**Frequency range:** 10 mHz to 100 kHz, 22 ranges in 1, 2, 5 steps

**Frequency accuracy:**  $\pm 50$  ppm of frequency range  $\pm$  measurement resolution (at  $+23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )

**Input filter:** Anti-aliasing filter (roll off characteristic -148 dB/oct.) is applied to each frequency range and automatically set  
However, at ranges of 1 kHz and below, analog and digital filters are used together

**Common-mode rejection ratio (CMRR):**

50 dB min. (with DC coupling, at 50/60 Hz)

**Maximum difference input voltage:**  $\pm 200$  V

**Maximum in-phase input voltage:**  $\pm 200$  V

**Input range:** +30 to -60 dBV (variable in 1 dB steps)

**Voltage display** 44.7 V to 1.41 mV, rms display, 31.6 V to 1 mV

**Auto range:** Set at the optimum range stated above according to the input signal (5 dB steps)

**Maximum in-phase signal voltage:**

$\pm 14$  V (-60 to -6 dBV range)

$\pm 140$  V (-5 to +14 dBV range)

$\pm 200$  V (+15 to +30 dBV range)

**Maximum input sensitivity:** -125 dBV (approx. 0.56  $\mu\text{V}_{\text{rms}}$ ) (at -140 dBV, 2 kHz range)

**Dynamic range:** All dynamic ranges are those measured at full scale in spectrum mode, 0 to 90% of frequency range, sine wave input with -3 dB amplitude level, 32 averagings, rectangular wave weighting, filter on, 400-spectrum-line condition.

Also, 1/f noise is excluded. ( $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )

85 dB min. (+30 to -30 dBV) (90 dB typ.)

80 dB min. (-31 to -40 dBV)

70 dB min. (-41 to -50 dBV)

60 dB min. (-51 to -60 dBV)

**Residual noise:** All residual noise values are those measured at full scale in spectrum mode, 32 averagings, rectangular wave weighting, filter on, 400-spectrum-line condition. Also, 1/f noise is excluded. However, at 0 to 90% of frequency range ( $23 \pm 5^{\circ}\text{C}$ )

-85 dB min. (+30 to -40 dBV)

-75 dB min. (-41 to -45 dBV)

-60 dB min. (-46 to -60 dBV)

**Amplitude linearity**  $\pm 0.2$  dB max.

(within -40 dB from full scale,  $+23 \pm 5^{\circ}\text{C}$ )

**Frequency flatness:**  $\pm 0.3$  dB max. (at  $23 \pm 5^{\circ}\text{C}$ )

At 0 to 90% of frequency range, AC coupled -3 dB point is approx. 0.2 Hz

**Amplitude accuracy:** Amplitude linearity + frequency flatness (at  $23 \pm 5^{\circ}\text{C}$ )

**Amplitude difference between channels:** In same sensitivity range, at 0 to 90% of frequency range (at  $23 \pm 5^{\circ}\text{C}$ )

R9211E/9211A	R9211B/9211C
Within $\pm 0.3$ dB	Within $\pm 0.1$ dB

**Phase difference between channels:** In same sensitivity range, at 0 to 90% of frequency range (at  $23 \pm 5^{\circ}\text{C}$ )

R9211E/9211A	R9211B/9211C
Within $\pm 3.0^{\circ}$	Within $\pm 1.0^{\circ}$

**Power supply for accelerometers:** Only AC input coupling, 4 mA source current, + side of channel A or B

Max. operating voltage +18 V, open circuit voltage 24 V max.

**Overload display:** LED

**Test signal:** At frequency ranges from 100 to 2 kHz, amplitude level: approx. -4 dBV, frequency: sine wave, 8% of range

#### Trigger

**Trigger modes:** Free run mode, manual trigger mode, external trigger mode, input signal trigger mode, automatic repeat trigger mode

**Trigger source:** Input signal trigger through channel A or B signal; external signal trigger by EXT signal

**Trigger level:**

Input signal trigger; Set by number keys with a resolution of 1/256 of amplitude range

External signal trigger; TTL, rising or falling edge can be selected (rear panel BNC connector)

**Trigger slope:** +, -,  $\pm$  (input signal trigger)

**Trigger position:** -128 K to +1 M sample, with 1 channel measurement

-64 K to +1 M sample, with 2 channel measurement

#### Averaging

**Frequency domain averaging modes:** Addition (SUM), subtraction (SUB), exponential function moving average (EXP), peak value detection (PEAK)

**Time domain averaging modes:** Addition (SUM)

**Delay domain averaging modes:** Addition (SUM)

**Amplitude domain averaging modes:** Addition (SUM)

**Number of averagings:** 1 to 32767

**Overlapping:** 0%, 50%, 75%, MAX

**Start/stop control:** Start, stop, +1, continue (except for servo mode) (erasing done automatically during start)

#### Measurement Modes

- Waveform measurement mode
- Spectrum measurement mode
- Time/frequency analysis mode
- Frequency response function measurement mode
- Servo analysis mode (R9211B/C)

#### Waveform Measurement Mode

**Measurement functions:**

Time domain instantaneous data, time domain average data, auto-correlation function, cross-correlation function, probability density function, cumulative distribution function

**Amount of analysis data:** 64 to 8192 points (1 channel), 64 to 4096 points (2 channels)

**Amount of delay domain data:** 64 to 2048 points

**Averaging:** Time domain averaging

Delay domain averaging

Amplitude domain averaging

**Conversion function:** Engineering units

**Marker analysis functions:** Peak value, rise time, fall time, pulse width, root-mean-square value

**Calculation functions:** Differentiation, integration, smoothing, trend elimination, basic arithmetic, pre-envelope

**Display functions:** Time/amplitude, amplitude/probability density, orbit

#### Spectrum Measurement Mode

**Measurement functions:** Complex spectrum, power spectrum, cross-spectrum, time waveform

**Averaging:** Frequency domain averaging

**Amount of analysis data:** 64 to 8192 points (1 channel)  
64 to 4096 points (2 channels)

**Frequency resolution:**

**Linear** 25 to 3200 lines (1 channel)

25 to 1600 lines (2 channels)

**Log** 3 decades max., 80 lines/decade

**Other** 1/3 octave, 1/1 octave

**Window functions:** Rectangular, Hanning, minimum, flat-pass, force/response

\* With log frequency resolution and octave resolution, window functions are Hanning, minimum or rectangular

**Weighting:** A, B, C weighting, C message weighting

**Conversion functions:** Engineering units

**Marker analysis functions:** Peak marker, next peak marker, band marker, harmonics marker, sideband marker, overall power, partial power, average power, dispersion

**Calculation functions:** Basic arithmetic, pre-envelope, lifted spectrum, power cepstrum, jw, 1/jw, smoothing

**Display functions:** Frequency/amplitude, frequency/phase, frequency/real number component, frequency/imaginary number component, Nyquist diagram

#### Time/Frequency Analysis Mode

**Basic measurement functions:** Time waveform, complex spectrum, power spectrum, cross-spectrum

**Time/frequency analysis mode:** Level monitor, phase monitor, frequency monitor

**Averaging:** Frequency domain averaging

**Frequency resolution:**

**Linear** 25 to 800 lines

**Log** 3 decades max., 80 lines/decade

**Other** 1/3 octave, 1/1 octave

**Window functions:** Rectangular, Hanning, minimum, flat-pass, force/response

\* With log frequency resolution and octave resolution, window functions are Hanning, minimum or rectangular

**Weighting:** A, B, C weighting, C message weighting

**Conversion functions:** Engineering units

**Marker analysis functions:** Peak marker, next peak marker, band marker, harmonics marker, sideband marker, overall power, attenuation power, partial power, average power, dispersion

**Calculation functions:** Basic arithmetic, pre-envelope, lifted spectrum, power cepstrum, jw, 1/jw, smoothing, cumulative level monitor

**Display functions:** Frequency/real number component, frequency/imaginary number component, frequency/amplitude, frequency/phase, Nyquist diagram, time/level, time/phase, time/frequency

#### Frequency Response Function Measurement Mode

**Measurement functions:**

Frequency response function, group delay, coherence function, power spectrum, phase spectrum, impulse response function, time waveform

**Averaging:** Frequency domain averaging

**Amount of analysis data:** 64 to 2048 points

**Frequency resolution:**

Linear, 25 to 800 lines

**Window functions:** Rectangular, Hanning, minimum, flat-pass, force/response

**Weighting:** A, B, C weighting, C message weighting

**Conversion functions:** Engineering units

**Marker analysis functions:** Peak marker, next peak marker, band marker, harmonics marker, sideband marker, overall power, partial power, average power, dispersion, + peak marker, - peak marker, X dB marker, shape factor marker, ripple marker

**Calculation functions:** Basic arithmetic, unwrapped phase, jw, 1/jw, reciprocal, impulse response, equalize, phase correction, COP (coherent output power)

**Display functions:** Frequency/amplitude, frequency/phase, frequency/real number component, frequency/imaginary number component, frequency/delay, frequency/associativity function, Nyquist diagram, Cole-Cole diagram, Nichols diagram

#### Servo Analysis Mode (R9211B/9211C)

**Measurement functions:**

Frequency response function, group delay, coherence function, power spectrum, cross-spectrum, time waveform

**Sweep modes:** Linear sweep, log sweep

**Signal source for servo measurement:** Linear/log sign sweep signal, linear multi-sign sweep signal, log multi-sign signal

**Output impedance:** 1  $\Omega$  max.

**Maximum output voltage:**

$\pm 15$  V (when output impedance is 1  $\Omega$  or less)

**Maximum output current:**

100 mA (when output impedance is 1  $\Omega$  or less)

**DC offset:**  $\pm 10$  V (0.1 V resolution)

**Summation amplifier:** Can be turned on or off

**Number of averagings:** Fixed or automatic

**Signal source bandwidth:** Fixed or automatic

**Frequency table servo function:** Measurement can be done by grouping together output waveform, output voltage, DC offset, measurement frequency range and number of averagings (20 groups max.)

Linear f table

Log f table

**Frequency resolution:**

**Linear** 25 to 800 lines

**Log** 1 to 6 decades (25 to 200 lines/decade)

However, setting of up to only 5 decades is possible at 200 lines.

**Conversion functions:** Engineering units

# Digital Spectrum Analyzers

Choice of 4 Types To Fit the Application

## R9211 Series (Continued From Previous Page)

**Marker analysis functions:** Peak marker, next peak marker, band marker, harmonics marker, sideband marker, overall power, partial power, average power, dispersion, + peak marker, - peak marker, X dB marker, shape factor marker, ripple marker, open loop Bode diagram marker, open loop gain marker

**Calculation functions:** Basic arithmetic, unwrapped phase,  $j\omega$ ,  $1/j\omega$ , reciprocal, impulse response, equalize, phase correction, COP (coherent output power), open/closed loop conversion

**Display functions:** Frequency/amplitude, frequency/phase, frequency/real number component, frequency/imaginary number component, frequency/group delay, frequency/associativity function, Nyquist diagram, Cole-Cole diagram, Nichols diagram

### Curve Fitting Function

Up to 20 groups of range poles and zeroes are sampled from frequency response function data

**Weighting:** Auto weight, uniform weight, user weight

**Conversion function:** Sampled range poles and zeroes can be converted to range poles and residue or polynomials

### Synthesis Function

Frequency response function, impulse response and step response can be synthesized from sampled range poles and zeroes or values of entered range poles and zeroes.

**Signal generator (R9211B/9211C)** Except for servo analysis mode

**Output waveform:** Sine wave (spot), swept sign, multi-sign, impulse, random, user selected waveform (max. memory size: 64 K words)

**Maximum output voltage:**  $\pm 15$  V (at 1  $\Omega$  max. output impedance)

**Maximum output current:** 100 mA (at 1  $\Omega$  max. output impedance)

**DC offset:**  $\pm 10$  V (0.1 V resolution)

**Output impedance:** 1  $\Omega$  max., 50  $\Omega$ , 600  $\Omega$

**Output modes:** Continuous, internal, external, external gate, manual

**Taper function:** 200 ms max.

**Summation amplifier:** Can be turned on or off

**Running zoom function:** (R9211A/9211C)

When the stop frequency is less than 10 kHz, the minimum span is 10 MHz. When the stop frequency is 10 kHz or more, zoom analysis can be done with a minimum span of 100 MHz.

**Comparator Function (R9211C)**

**Setting modes:** Table mode, reference mode

**Table mode:** Up to 20 groups of compare sections can be set

**Reference mode:** Comparator can be done against a reference waveform

**Target waveform:** Comparator can be done against frequency domain data

**Comparator results:**

- PASS/FAIL displayed on screen
- Buzzer
- Output from rear by TTL O/C

### Display Specifications and Functions

**Display functions:** 8-inch raster scan CRT

**Engineering units:** Marker readout values and vertical axis scaling can be displayed as freely specified physical quantities

**Scaling:** Linear/log scaling, scaling can be done independently for each channel

**Units:** Up to any 2 characters among those specified can be set

**Display modes:** 1, 2, 3 or 4 screen display

**Overlapping display mode:** Data in the same domain or analysis range can be displayed in overlapping format

**Lattice display:** Can be turned on or off

**3-D display:** Up to 50 lines of the desired display data can be displayed in 3-D

**Bar display:** Overall power, partial power, average power or power dispersion can be shown as a bar display at the right edge of the CRT screen

**Labels:** Up to 40 alphanumeric or special characters can be displayed and moved up and down

**List modes:**

**Single mode** 20 spectrum frequency values and level values in the display can be selected by cursor and listed in a digital display

**Harmonics mode** When the basic spectrum is set by entering the values, the level values are listed in a digital display, and THD (total harmonic distortion) and THP (total harmonic power) are calculated and displayed.

**Sideband mode** When carrier frequency and modulated signal frequency are set by entering the values, the upper waveband and lower waveband power up to the 10th degree is calculated and displayed

**Horizontal axis:** Linear, log

**Vertical axis:** Can be freely set by entering the values

**Calendar/clock function:** Calendar (year/month/day) and hour/minutes display

**Memory function:**

	R9211E	R9211A	R9211B	R9211C
Memory (128K words)	Standard	Standard	Standard	-
I/O + memory (1 M words)	Option 11	Option 11	Option 11	Standard
CMOS memory (1 M words)	Option 10	Option 10	Option 10	Option 10

**Transient waveform data memory:** In time/frequency analysis mode

**Panel memory:** Remembers panel settings (battery backup, settings last about 1 month)

### Input/Output Functions

**GPIB interface:** Provided as standard

**Plotter output:** Direct plotting can be done with any ADVANTEST plotter with a GPIB interface, or a plotter with HPGL function and GPIB cable

**External sampling clock input:** BNC type, TTL level

**External trigger input:** BNC type, TTL level

**Sampling clock output:** BNC type, TTL level

**Trigger output signal:** BNC type, TTL level

### Floppy Disk Drive

R9211E	R9211A	R9211B	R9211C
Option 06	Standard	Standard	Standard

**Type:** 3.5 inch micro floppy disk

**Media:** 2DD/2HD (automatically identified)

**Capacity:** 720 K/1.2 M bytes (when formatted)

**Format:** Can be converted to MS-DOS format

**File format:** Data file, view file, table file

**Data file operations:** List, create, erase, search, copy

### I/O + Memory Function

R9211E	R9211A	R9211B	R9211C
Option 11	Option 11	Option 11	Standard

**Memory capacity:** 1 M words (2 M bytes)

**Digital input:** Digital input can be done with the internal A/D converter, or an external digital signal (max. sampling rate 256 kHz)

**Data format:** 16 bit + EOC signal (offset binary)

**Digital output:** Internal A/D converter data is output  
Data format: 16 bit + channel identifier signal + strobe signal  
(offset binary)

**Comparator output:** (R9211C) Comparator function output is possible using O/C output

#### CMOS Memory Function

R9211E	R9211A	R9211B	R9211C
Option 10	Option 10	Option 10	Option 10

1 M words (2 M bytes) battery backup memory

#### Thermal Printer

R9211E	R9211A	R9211B	R9211C
Option 07	Option 07	Option 07	Option 07

Hard copy of CRT screen

**Printing method:** Thermal line/dot method

**Dot configuration:** 640 dots/line

**Paper used:** A09075

**Paper width:** 114 mm

#### High speed calculation processor functions

R9211E	R9211A	R9211B	R9211C
—	Option 12	—	Standard

High speed numerical calculations

#### Running Zoom Analysis Function (R9211A/9211C)

When the stop frequency is less than 10 kHz, the minimum span is 10 mHz. When the stop frequency is 10 kHz or more, zoom analysis can be done with a minimum span of 100 mHz.

#### General Specifications

**Operating conditions:** Temperature +5 to +35°C, RH 80% max.

**Storage conditions:** Temperature -20 to +60°C

**Power supply:** Specify at time of ordering

Option no.	Standard	32	42	44
Power voltage (V)	90 to 110	103 to 132	198 to 242	207 to 250

48 to 66 Hz

**Power consumption:** Standard

R9211E	R9211A	R9211B	R9211C
140 VA max.	160 VA max.	170 VA max.	190 VA max.

**External dimensions:** Approx. 330 (W) × 177 (H) × 450 (D) mm

**Mass:** Main unit

R9211E	R9211A	R9211B	R9211C
12 kg max.	14 kg max.	14 kg max.	16 kg max.

#### Accessories

**Power Cable:** A01402 (one)

**Input Cables:** MI-77 (two)

T-Type Connector

**Accessories (Sold Separately)**

<b>A02804</b>	Front Cover
<b>R16211</b>	Carrying Case
<b>R16055</b>	Transit Case
<b>A02034</b>	Panel Mount Set
<b>A02255</b>	Rack Mount Set (JIS standard)
<b>A02455</b>	Rack Mount Set (EIA standard)