R3132 Specifications

Frequency

Frequency range:	9 kHz to 3 GHz
Frequency reading accuracy: (Start, stop, center frequency, marker frequency)	± (Reading of frequency x Frequency reference accuracy + Span x 1% + RBW x 15% + 60 Hz)
Counter	
Resolution:	1 Hz to 1 kHz
Accuracy:	± (Marker frequency x Frequency reference accuracy + 1LSD) (S/N ≥ 25 dB, span ≤ 200 MHz)
Frequency reference accuracy	
Stability:	±2 x 10^{-6}/year, ±1 x 10^{-7}/year (Option 20) ±1 x 10^{-5} (0 to 50 °C), ±2 x 10^{-8}/day (Option 20)
Frequency span	
Range:	1 kHz to 3 GHz, 0 Hz (zero span)
Accuracy:	≤ ±1%
Residual FM:	≤ 60 Hzp-p/0.1s, ≤ 20 Hzp-p/0.1s (Option 20)

Signal purity:	offset	f ≤2.6 GHz	f >2.6 GHz
	20 kHz	≤ -105 dBc/Hz	≤ -103 dBc/Hz
* RBW 300 Hz (Option 27)	10 kHz	≤ -100 dBc/Hz*	≤ -98 dBc/Hz*

Resolution bandwidth (3 dB)	
Range:	1 kHz to 3 MHz, 1-3-10 sequence 30 Hz, 100 Hz, 300 Hz (Option 27)
Accuracy:	< ±20%, 1 kHz to 1 MHz < ±25%, 3 MHz < ±20% (added with Option 27)
6 dB bandwidth:	1 MHz, 120 kHz, 9 kHz 200 Hz (Option 27)
Video bandwidth:	10 Hz to 3MHz, 1-3-10 sequence

Amplitude range

Measuring range:	+30 dBm to average noise level
Maximum input level (Input ATT ≥10 dB)	
Preamplifier OFF:	+30 dBm, ±50 VDC max.
Preamplifier ON:	+13 dBm, ±50 VDC max.
Indication range:	10 x 10 div
Log:	10, 5, 2, 1 dB/div
Linear:	10% of the reference level/div.
Reference level range	
Preamplifier OFF:	(Input ATT: 0 to 50 dB)
Log:	-64 to +40 dBm (0.1 dB step)
Linear:	141.1 µV to 22.36 V
Preamplifier ON:	(Input ATT: 0 to 30 dB)
Log:	-82 to +10 dBm (0.1 dB step)
Linear:	17.76 µV to 707.1 mV
Input ATT range:	0 to 50 dB (5 dB step)

Dynamic range

Average nose level:	RBW 1 kHz, VBW 10 Hz, input ATT 0 dB, f ≥10 MHz
Preamplifier OFF:	-117 dBm + 2f (GHz) dB*1
Preamplifier ON:	-132 dBm + 3f (GHz) dB
1 dB gain compression:	f ≥200 MHz
Preamplifier OFF:	> 0 dBm (mixer input level)
Preamplifier ON:	> -25 dBm (RF input level)
Spurious response:	Preamplifier OFF, Mixer input -30 dBm
2nd-order harmonic distortion:	≤ -70 dBc (100 MHz ≤ f <800MHz) ≤ -80 dBc(f ≤ 800MHz)
2 signal 3rd-order intermodulation distortion:	≤ -80 dBc (f ≥200 MHz, Offset >50 kHz)
Residual response:	When input ATT 0 dB, 50 Ω terminated, and 1 MHz to 3 GHz
Preamplifier OFF:	≤ -100 dBm
Preamplifier ON:	≤ -105 dBm

Amplitude accuracy

Frequency response:	After auto calibration at ATT = 10 dB
Preamplifier OFF:	≤ ±0.5 dB (100 kHz to 3 GHz)*2 ≤ ±2 dB (9 kHz to 3 GHz)
Preamplifier ON:	≤ ±1 dB (100 kHz to 2.7 GHz) ≤ ±2 dB (9 kHz to 3 GHz)
Calibration signal level accuracy:	-20 dBm ±0.3 dB
IF gain error:	After auto calibration < ±0.5 dB
Scale indication accuracy:	After auto calibration
Log:	≤ ±1.5 dB/80 dB ≤ ±1dB/10 dB ≤ ±0.2 dB/1 dB
Linear:	±5% of reference level
Input ATT switching error:	≤ ±0.3 dB (for 0 to 50 dB, with reference to 30 MHz/10 dB)
Resolution bandwidth switching level error:	After auto calibration < ±0.5 dB
Total level accuracy:	±1.5 dB (REF = -50 to 0 dBm, ATT = 10 dB, 2 dB/div, RBW = 300 kHz, f > 100 kHz, after auto calibration)

Sweep

Sweep time:	20 ms to 1000 s, 50 µs to 1s (Option 29, zero span)
Accuracy:	< ±2%
Trigger mode:	FREE RUN, LINE, VIDEO, EXT, TV,
Sweep mode:	REPEAT, SINGLE

I/O

RF input	
Connector:	N type female
Impedance:	50 Ω (nominal)
VSWR	
Preamplifier OFF:	<1.5:1 (100 kHz to 2 GHz) Input ATT = 10 to 50 dB <2:1 (9 kHz to 3 GHz) Input ATT = 5 to 50 dB
Preamplifier ON:	<2.5:1 (9 kHz to 3 GHz)
Probe power:	±12 V, 4-pin connector
Calibration output signal:	BNC female, 50 Ω (nominal) 30 MHz, -20 dBm
10 MHz reference input:	BNC female, 500 Ω (nominal) -10 to +10 dBm
External trigger input:	BNC female
Sound output (demodulated audio):	Small monophonic jack
GPIB interface:	IEEE-488 BUS connector
RS232 interface:	D-sub 9-pin
Printer interface:	D-sub 25-pin, ESC/P, ESC/P-R, PCL
Video output:	VGA (15-pin, female)
Floppy disk:	3.5-inch, MS-DOS format

General specifications

Operating temperature:	0 to +50 °C, Relative humidity 85% or less (no dew condensation)
Storage temperature:	-20 to +60 °C, relative humidity 85% or less
Power supply:	100/200 VAC auto-switchable 100 VAC: 100 to 120 VAC, 50 to 60 Hz 200 VAC: 200 to 240 VAC, 50 to 60 Hz
Power consumption:	200 VA or less
Dimensions:	Approx. 424 (W) x 177 (H) x 300 (D) mm (excluding feet and connectors)
Mass:	14 kg or less (excluding options, cover, and accessories)

R3132N Specifications

Frequency

Frequency range:	9 kHz to 3 GHz
Frequency reading accuracy: (Start, stop, center frequency, marker frequency)	±(Reading of frequency x Frequency reference accuracy + Span x 1% + RBW x 15% + 60 Hz)
Counter	
Resolution:	1 Hz to 1 kHz
Accuracy:	±(Marker frequency x Frequency reference accuracy + 1LSD) (S/N ≥25 dB, span ≤200 MHz)
Frequency reference accuracy	
Stability:	±2 x 10^{-6}/year, ±1 x 10^{-7}/year (Option 20) ±1 x 10^{-5} (0 to 50°C), ±2 x 10^{-8}/day (Option 20)
Frequency span	
Range:	1 kHz to 3 GHz, 0 Hz (zero span)
Accuracy:	≤±1%
Residual FM:	≤60 Hzp-p/0.1s, ≤20 Hzp-p/0.1s (Option 20)

Signal purity:	offset	f ≤2.6 GHz	f > 2.6 GHz
	20 kHz	≤-105 dBc/Hz	≤-103 dBc/Hz
* RBW 300 Hz (Option 27)	10 kHz	≤-100 dBc/Hz*	≤-98 dBc/Hz*

Resolution bandwidth (3 dB)	
Range:	1 kHz to 3 MHz, 1-3-10 sequence 30 Hz, 100 Hz, 300 Hz (Option 27)
Accuracy:	<±20%, 1 kHz to 1 MHz <±25%, 3 MHz <±20% (added with Option 27)
6 dB bandwidth:	1 MHz, 120 kHz, 9 kHz 200 Hz (Option 27)
Video bandwidth:	10 Hz to 3MHz, 1-3-10 sequence

Amplitude range

Measuring range:	+134 dBµV to average noise level
Maximum input level (Input ATT ≥10 dB)	
Preamplifier OFF:	+134 dBµV, ±50 VDC max.
Preamplifier ON:	+120 dBµV, ±50 VDC max.
Indication range:	10 x 10 div
Log:	10, 5, 2, 1 dB/div
Linear:	10% of the reference level/div.
Reference level range	
Preamplifier OFF:	(Input ATT: 0 to 50 dB)
Log:	+44.8 dBµV to +148.8 dBµV (0.1 dB step)
Linear:	172.8 µV to 27.39 V
Preamplifier ON:	(Input ATT: 0 to 30 dB)
Log:	+26.8 dBµV to +118.8 dBµV (0.1 dB step)
Linear:	21.75 µV to 866 mV
Input ATT range:	0 to 50 dB (5 dB step)

Dynamic range

Average nose level:	RBW 1 kHz, VBW 10 Hz, input ATT 0 dB, f ≥10 MHz
Preamplifier OFF:	-6 dBµV + 2f (GHz) dB[*1]
Preamplifier ON:	-21 dBµV + 3f (GHz) dB
1 dB gain compression:	f ≥200 MHz
Preamplifier OFF:	> +107 dBµV (mixer input level)
Preamplifier ON:	> +82 dBµV (RF input level)
Spurious response:	Preamplifier OFF, Mixer input +77 dBµV
2nd-order harmonic distortion:	≤-70 dBc (100 MHz ≤ f <800MHz) ≤-80 dBc (f ≤800MHz)
2 signal 3rd-order intermodulation distortion:	≤-80 dBc (f ≥200 MHz, Offset >50 kHz)
Residual response:	When input ATT 0 dB, 75 Ω terminated, and 1 MHz to 3 GHz
Preamplifier OFF:	≤ +7 dBµV
Preamplifier ON:	≤ +2 dBµV

Amplitude accuracy

Frequency response:	After auto calibration at ATT = 10 dB
Preamplifier OFF:	≤±0.5 dB (100 kHz to 2.2 GHz)[*2] ≤±2 dB (9 kHz to 2.2 GHz)
Preamplifier ON:	≤±1 dB (100 kHz to 2.2 GHz) ≤±2 dB (9 kHz to 2.2 GHz)
Calibration signal level accuracy:	-20 dBm ±0.3 dB
IF gain error:	After auto calibration <±0.5 dB
Scale indication accuracy:	After auto calibration
Log:	≤±1.5 dB/80 dB ≤±1dB/10 dB ≤±0.2 dB/1 dB
Linear:	±5% of reference level
Input ATT switching error:	≤±0.3 dB (for 0 to 50 dB, with reference to 30 MHz/10 dB)
Resolution bandwidth switching level error:	After auto calibration <±0.5 dB
Total level accuracy:	±1.5 dB (REF = +57 to +107 dBµV, ATT = 10 dB, 2 dB/div, RBW = 300 kHz, 100 kHz < f ≤2.2GHz after auto calibration)

Sweep

Sweep time:	20 ms to 1000 s, 50 µs to 1s (Option 29, zero span)
Accuracy:	<±2%
Trigger mode:	FREE RUN, LINE, VIDEO, EXT, TV,
Sweep mode:	REPEAT, SINGLE

I/O

RF input	
Connector:	N type female
Impedance:	75 Ω (nominal)
VSWR	
Preamplifier OFF:	<1.5:1 (100 kHz to 2.2 GHz) Input ATT = 10 to 50 dB <2:1 (9 kHz to 2.2 GHz) Input ATT = 5 to 50 dB
Preamplifier ON:	<2.5:1 (9 kHz to 2.2 GHz)
Probe power:	±12 V, 4-pin connector
Calibration output signal:	BNC female, 75 Ω (nominal) 30 MHz, -20 dBm
10 MHz reference input:	BNC female, 500 Ω (nominal) -10 to +10 dBm
External trigger input:	BNC female
Sound output (demodulated audio):	Small monophonic jack
GPIB interface:	IEEE-488 BUS connector
RS232 interface:	D-sub 9-pin
Printer interface:	D-sub 25-pin, ESC/P, ESC/P-R, PCL
Video output:	VGA (15-pin, female)
Floppy disk:	3.5-inch, MS-DOS format

General specifications

Operating temperature:	0 to +50 °C, Relative humidity 85% or less (no dew condensation)
Storage temperature:	-20 to +60 °C, relative humidity 85% or less
Power supply:	100/200 VAC auto-switchable 100 VAC: 100 to 120 VAC, 50 to 60 Hz 200 VAC: 200 to 240 VAC, 50 to 60 Hz
Power consumption:	200 VA or less
Dimensions:	Approx. 424 (W) x 177 (H) x 300 (D) mm (excluding feet and connectors)
Mass:	14 kg or less (excluding options, cover, and accessories)

R3162 Specifications

Frequency

Frequency range:	9 kHz to 8 GHz
Frequency band:	Frequency band Band 9 kHz to 3.3 GHz 0 3.2 GHz to 6.6 GHz 1- 6.5 GHz to 8 GHz 1+
Frequency reading accuracy: (Start, stop, center frequency, marker frequency)	±(Reading of frequency x Frequency reference accuracy + Span x 1% + RBW x 15% + 60 Hz)
Counter	
Resolution:	1 Hz to 1 kHz
Accuracy:	±(Marker frequency x Frequency reference accuracy + 1LSD) (S/N ≥ 25 dB, span ≤ 200 MHz)
Frequency reference accuracy	
Stability:	±2 x 10^{-6}/year, ±1 x 10^{-7}/year (Option 20) ±1 x 10^{-5} (0 to 50°C), ±2 x 10^{-8}/day (Option 20)
Frequency span	
Range:	1 kHz to 8 GHz, 0 Hz (zero span)
Accuracy:	≤ ±1%
Residual FM:	≤ 60 Hzp-p/0.1s, ≤ 20 Hzp-p/0.1s (Option 20)

Signal purity:	offset	f ≤2.6 GHz	f >2.6 GHz
	20 kHz	≤ -105 dBc/Hz	≤ -103 dBc/Hz
* RBW 300 Hz (Option 27)	10 kHz	≤ -100 dBc/Hz*	≤ -98 dBc/Hz*

Resolution bandwidth (3 dB)	
Range:	1 kHz to 3 MHz, 1-3-10 sequence 30 Hz, 100 Hz, 300 Hz (Option 27)
Accuracy:	< ±20%, 1 kHz to 1 MHz < ±25%, 3 MHz < ±20% (added with Option 27)
6 dB bandwidth:	1 MHz, 120 kHz, 9 kHz 200 Hz (Option 27)
Video bandwidth:	10 Hz to 3MHz, 1-3-10 sequence

Amplitude range

Measuring range:	+30 dBm to average noise level
Maximum input level (Input ATT ≥10 dB)	
Preamplifier OFF:	+30 dBm, 0 VDC max.
Preamplifier ON:	+13 dBm, 0 VDC max.
Indication range:	10 x 10 div
Log:	10, 5, 2, 1 dB/div
Linear:	10% of the reference level/div.
Reference level range	
Preamplifier OFF:	(Input ATT: 0 to 75 dB)
Log:	-64 to +65 dBm (0.1 dB step)
Linear:	141.1 µV to 397.63 V
Preamplifier ON:	(Input ATT: 0 to 30 dB)
Log:	-82 to +10 dBm (0.1 dB step)
Linear:	17.76 µV to 707.1 mV
Input ATT range:	0 to 75 dB (5 dB step)

Dynamic range

Average nose level:	RBW 1 kHz, VBW 10 Hz, input ATT 0 dB, f ≥10 MHz
Preamplifier OFF*1:	Band 0: -117 dBm + 2f (GHz) dB Band 1-: -115 dBm + 0.5f (GHz) dB Band 1+: -115 dBm + 0.5f (GHz) dB
Preamplifier ON:	-132 dBm + 3f (GHz) dBm (at 1 MHz to 3.3 GHz)
1 dB gain compression:	f ≥200 MHz
Preamplifier OFF:	> 0 dBm (mixer input level)
Preamplifier ON:	> -25 dBm (RF input level)
Spurious response:	Preamplifier OFF

2nd-order harmonic distortion:	Frequency range	Mixer input	Distortion level
	100 MHz ≤ f <800 MHz	-30 dBm	≤ -70 dBc
	f ≥800 MHz (Band 0)	-30 dBm	≤ -80 dBc
	f ≥3.3 GHz	-10 dBm	≤ -100 dBc

2 signal 3rd-order intermodulation distortion:	≤ -80 dBc (Mixer input -30 dBm, f ≥200 MHz, Offset > 50 kHz)
Image/multiple/ outband response:	≤70 dBC
Residual response:	When input ATT 0 dB, 50Ω terminated
Preamplifier OFF:	≤ -100 dBm (1 MHz to 3.3 GHz) ≤ -90 dBm (>3.3 GHz)
Preamplifier ON:	≤ -105 dBm (1 MHz to 3.3 GHz)

Amplitude accuracy

Frequency response:	After auto calibration Preselector peak After adjustment at ATT = 10 dB
Preamplifier OFF:	≤ ±0.5 dB (100 kHz to 3 GHz)*2 ≤ ±2 dB (9 kHz to 3.3 GHz) ≤ ±2 dB (3.2 to 8 GHz)
Preamplifier ON:	≤ ±1 dB (100 kHz to 2.7 GHz) ≤ ±2 dB (9 kHz to 3.3 GHz)
Calibration signal level accuracy:	-20 dBm ±0.3 dB
IF gain error:	After auto calibration < ±0.5 dB
Scale indication accuracy:	After auto calibration
Log:	≤ ±1.5 dB/80 dB ≤ ±1 dB/10 dB ≤ ±0.2 dB/1 dB
Linear:	±5% of reference level
Input ATT switching error:	≤ ±0.3 dB (for 0 to 50 dB, with reference to 30 MHz/10 dB)
Resolution bandwidth switching level error:	After auto calibration < ±0.5 dB
Total level accuracy:	±1.5 dB (REF = -50 to 0 dBm, ATT = 10 dB, 2 dB/div, RBW = 300 kHz, f = 100 kHz to 3 GHz, after auto calibration)

Sweep

Sweep time:	20 ms to 1000 s, 50 µs to 1s (Option 29, zero span)
Accuracy:	< ±2%
Trigger mode:	FREE RUN, LINE, VIDEO, EXT, TV,
Sweep mode:	REPEAT, SINGLE

I/O

RF input	
Connector:	N type female
Impedance:	50 Ω (nominal)
VSWR	
Preamplifier OFF:	<2:1 (9 kHz to 3.3 GHz) <2:1 (3.2 to 8 GHz) Input ATT = 10 to 75 dB
Preamplifier ON:	<2.5:1 (9 kHz to 3.3 GHz)
Probe power:	±12 V, 4-pin connector
Calibration output signal:	BNC female, 50 Ω (nominal) 30 MHz, -20 dBm
10 MHz reference input:	BNC female, 500 Ω (nominal) -10 to +10 dBm
External trigger input:	BNC female
Sound output (demodulated audio):	Small monophonic jack
GPIB interface:	IEEE-488 BUS connector
RS232 interface:	D-sub 9-pin
Printer interface:	D-sub 25-pin, ESC/P, ESC/P-R, PCL
Video output:	VGA (15-pin, female)
Floppy disk:	3.5-inch, MS-DOS format

General specifications

Operating temperature:	0 to +50 °C, Relative humidity 85% or less (no dew condensation)
Storage temperature:	-20 to +60 °C, relative humidity 85% or less
Power supply:	100/200 VAC auto-switchable 100 VAC: 100 to 120 VAC, 50 to 60 Hz 200 VAC: 200 to 240 VAC, 50 to 60 H
Power consumption:	200 VA or less
Dimensions:	Approx. 424 (W) x 177 (H) x 300 (D) mm (excluding feet and connectors)
Mass:	15 kg or less (excluding options, cover, and accessories)

*1 *Temperature range at 20 to 30 °C 2 dB is added in the range of 0 to 50 °C*
*2 *Temperature range at 20 to 30 °C 0.5 dB is added in the range of 0 to 50 °C*

Options

OPT.73 Wide-range FM demodulation

Measuring amplitude range:	**> -50 dBm + input attenuation value (at center frequency 1 GHz, RBW Wide, -20 dB or more than reference level)**
FM Deviation	
Measuring range	**2.5 MHz, 1 MHz, 500 kHz, 250 kHz, 100 kHz, 50 kHz, 25 kHz, 10 kHz**
Linearity error*:	**≤ (2 % of measuring range)**
Offset error*:	**≤ (4 % of measuring range + K + Readout of frequency x Frequency reference accuracy) K; 8 kHz (measuring range 2.5 MHz to 250 kHz) 2 kHz (measuring range 100 kHz to 10 kHz)**
Demodulation frequency bandwidth (3 dB):	**≤ 300 kHz (nominal)**

∗ These errors are values obtained by executing "FM Demod ALL CAL" software, after warming up the R3132/3132N/3162 for 30 minutes or more.

OPT.74 Tracking generator

Frequency range:	**100 kHz to 3.0 GHz**
Output level range:	**0 to -59.9 dBm**
Output level accuracy:	**± 0.5 dB (30 MHz, -10 dBm, 20 to 30°C)**
Output level flatness:	**± 1.0 dB (100 kHz to 1 GHz) ± 1.5 dB (100 kHz to 3 GHz) (-10 dBm, 30 MHz reference)**
Spurious	
Harmonics:	**≤ -20 dBc (output level = -10 dBm)**
Non-harmonics:	**≤ -30 dBc (output level = -10 dBm)**

Specifications may change without notification.