### **R3172 Specifications**

Frequency		
Frequency range: Preamplifier OFF	9 kHz to 26.5 GHz	Harmonic order (N)
band 0:	9 kHz to 3.3 GHz	1
band 1:	3.2 to 7.1 GHz	1
band 2:	7 to 14.7 GHz	2
band 3:	14.5 to 26.5 GHz	4
Preamplifier ON band 0:	9 kHz to 3.3 GHz	1
Frequency reading accuracy (Start, Stop, CF, Marker):	± (Reading of freque reference accuracy + + RBW x 0.15 + 60 H	Span x Span accuracy
Counter Resolution:	1 Hz to 1 kHz	y Fraguenay
Accuracy:	± (Marker frequency reference accuracy + (S/N ≥25 dB, span ≤2	Residual FM + 1 LSD)
Frequency reference accuracy		
Stability: Temperature stability:	±2 x 10 <sup>-6</sup> /year ±1 x 10 <sup>-5</sup> (0 to +50°C)	)
Frequency span		
Range: Accuracy:	1 kHz to 26.5 GHz, 0 ≤±1%	Hz (zero span)
Residual FM Zero span:	≤ (60 Hzp-p x N) /100	 ) ms
	= (00 112p-p x 14) / 100	, 1113
Noise sideband Frequency ≤ 2.6 GHz:	≤-100 dBc/Hz (at 10 kHz offset, RB ≤-105 dBc/Hz (at 20	
Frequency >2.6 GHz:	≤ (-98 + 20 logN) dBc (at 10 kHz offset, RB ≤ (-103 + 20 logN) dE (at 20 kHz offset)	/Hz W 300 Hz (OPT.27)
Resolution bandwidth at 3 dB		
Range: Accuracy:	1 kHz to 3 MHz (1-3- ±20% 1 kHz to 1 MH ±25% 3 MHz	
Selectivity (60 dB:3 dB):	<15 : 1	
QP (6 dB) Range:	1 MHz, 120 kHz, 9 kH	
Video bandwidth:	10 Hz to 3 MHz (1-3-	10 sequence)
Amplitude range		
Measuring range	+30 dBm to displaye	d average noise level
Maximum input level	(Input attenuator ≥1	
Preamplifier OFF: Preamplifier ON:	+30 dBm, 0 VDC max +13 dBm, 0 VDC max	
Indication range		
Log:	10 x 10 div, 10, 5, 2,	1 dB/div
Linear:	10% of reference lev	
Reference level range		
Preamplifier OFF:	(Input attenuator 0 t	
Log: Linear:	-64 to +60 dBm (0.1 d	
Preamplifier ON:	+141.1 µV to +223.6 (Input attenuator 0 t	
Log:	-82 to +10 dBm (0.1	
Linear:	+17.76 μV to +707.1	mV
Input attenuator range:	0 to 70 dB (10 dB ste	p)
Sweep		
Sweep time:	10 ms to 1000 s (Sweep time under 2 span 100 MHz or less	20 ms can be set up at s)
Accuracy:	±2%	
Trigger mode:	FREE RUN, LINE, VIDI	EO, EXT, TV

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Displayed average noise level:	RBW 1 kHz, VBW 10 Hz,
	input attenuator 0 dB, f ≥ 10 MHz

Preamplifier OFF

10 MHz to 3.3 GHz (band 0): -117 dBm + 2 f (GHz) dB<sup>-1</sup>

3.2 to 7.1 GHz (band 1): -112 dBm' 1
7 to 14.7 GHz (band 2): -111 dBm' 1
14.5 to 22 GHz (band 3): -107 dBm' 1
22 to 26.5 GHz (band 3): -104 dBm' 1

Preamplifier ON

1 MHz to 3.3 GHz: -132 dBm + 3 f (GHz) dB

# 1 dB gain compression

Preamplifier OFF

200 MHz to 3.3 GHz (band 0): >0 dBm (mixer input level)
3.2 to 26.5 GHz (band 1 to 3): >-5 dBm (mixer input level)
Preamplifier ON (Input attenuator 0 to 30 dB)
200 MHz to 3.3 GHz (band 0): >-25 dBm (RF input level)

## Spurious response: preamplifier OFF

Second harmonic distortion:

Frequency range	Mixer level	Distortion level
100 to 800 MHz	-30 dBm	≤-70 dBc
≥800 MHz (band 0)	-30 dBm	≤-80 dBc
≥3.3 GHz	-10 dBm	≤-100 dBc

Third order intermodulation distortion:

tortion: ≤-80 dBc (200 MHz to 3.3 GHz, band 0)

≤-70 dBc (3.2 to 26.5 GHz, band 1 to 3) (mixer input level -30 dBm, two signal difference >50 kHz)

Image/Multiple/

Out of band response: < -70 dBc (10 MHz  $\le$  f  $\le$  18 GHz) < -60 dBc (18 GHz < f  $\le$  23 GHz) < -50 dBc (23 GHz < f  $\le$  26.5 GHz)

0 dB, f ≥1 MHz) ≤-100 dBm (band 0)

Preamplifier OFF: ≤-100 dBm (band 0) ≤-90 dBm (band 1 to 3) Preamplifier ON: ≤-105 dBm (band 0)

## Amplitude accuracy

Frequency response

(after calibration and preselector peak, attenuator 10 dB) Preamplifier OFF

Frequency range	Relative		Absolute*2	
rrequericy rarige	20 to 30°C	0 to 50°C	20 to 30°C	0 to 50°C
100 kHz to 3 GHz	±0.5 dB	±1.0 dB	±0.6 dB	±1.0 dB
9 kHz to 3.3 GHz	±1.5 dB	±2.0 dB	±1.5 dB	±2.0 dB
3.3 to 7.1 GHz	±1.6 dB	±1.8 dB	±1.8 dB	±2.5 dB
7.1 to 14.7 GHz	±1.8 dB	±2.0 dB	±2.0 dB	±3.0 dB
14.7 to 26.5 GHz	±2.5 dB	±3.0 dB	±3.0 dB	±4.0 dB

### Preamplifier ON

Frequency range	Relative		Absolute <sup>*2</sup>	
rrequericy rarige	20 to 30°C		20 to 30°C	0 to 50°C
100 kHz to 2.7 GHz 9 kHz to 3.3 GHz	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB

Calibration signal level accuracy: -20 dBm ±0.3 dB

IF gain error

(after automatic calibration): ±0.5 dB

Scale indication accuracy (after automatic calibration)

Log: ±1.5/90 dB, ±1.0/10 dB, ±0.2/1 dB Liner: ±5% of reference level

Input ATT switching error:

 $\leq \pm 1.1/10$  dB, 2 dB max. (9 kHz to 12 GHz)  $\leq \pm 1.3/10$  dB, 2.5 dB max. (12 to 18 GHz)  $\leq \pm 1.8/10$  dB, 3.5 dB max. (18 to 26.5GHz) in reference to an attenuation of 10dB at 30 MHz

<sup>\*1:</sup> For a temperature range of 20 to 30°C. Add 2 dB for a temperature range of 0 to 50°C.

<sup>\*2:</sup> In reference to 30 MHz calibration signal.

Resolution bandwidth switchinglevel error	
(after automatic calibration):	±0.5 dB
Total level accuracy Preamplifier OFF:	±1.5 dB (REF = -50 to 0 dBm, ATT = 10 dB, 2 dB/div, RBW = 300 kHz, f = 100 kHz to 3 GHz, after automatic calibration)
I/O	
RF input	
Connector:	N connector (female)
Impedance:	(changeable to SMA female) 50 $\Omega$ (nominal)
VSWR (at tuned frequency)	
Preamplifier OFF:	< 1.5 : 1 (9 kHz to 3.3 GHz, band 0) (typical)
	<2:1 (3.2 to 26.5 GHz, band 1 to 3)
	(typical) with input ATT 10 to 70 dB
Preamplifier ON:	< 2.5 : 1 (9 kHz to 3.3 GHz, band 0)
	(typical)
Probe power:	±12 V (nominal), 4-pin connector
Calibration output signal:	BNC female, 50 $\Omega$ (nominal) 30 MHz, -20 dBm
10MHz reference input:	BNC female, 500 $\Omega$ (nominal) -10 to +10 dBm
External trigger input:	BNC female
Y axis output:	BNC female Approx. 2 V in full scale (10 dB/div)
Phone output:	Small size monophonic female
GPIB interface:	IEEE-488 BUS connector
Serial interface:	D-Sub 9-pins
Printer interface:	D-Sub 25-pins, ESC/P, ESC/P-R, PCL
Video output:	VGA (15-pins, female)
Floppy disk:	3.5-inch, MS-DOS format
General specifications	
Operating temperature:	0 to +50°C
	Relative humidity 85% or less (no condensation)
Starage temperature	-20 to +60°C.
Storage temperature:	Relative humidity 85% or less
	· · · · · · · · · · · · · · · · · · ·
	Automatic switching to 100 or 200 VA
Power source: 100 VAC: 200 VAC:	Automatic switching to 100 or 200 V/ 100 to 120 VAC, 50 to 60 Hz 220 to 240 VAC, 50 to 60 Hz
100 VAC: 200 VAC:	100 to 120 VAC, 50 to 60 Hz
100 VAC: 200 VAC: Power consumption:	100 to 120 VAC, 50 to 60 Hz 220 to 240 VAC, 50 to 60 Hz
	100 to 120 VAC, 50 to 60 Hz 220 to 240 VAC, 50 to 60 Hz <200 VA Approx. 424 (W) x 177 (H) x 300 (D) m

Options OPT.16 to 20, 27, 29 or 73,	please refer options for R3182 (page 16 to 17).
OPT.03 Local signal ou	tput for external mixer
Frequency range:	4.0 to 7.6 GHz
Output level:	>+8 dBm
Output impedance:	50 $\Omega$ (nominal)
Connector:	SMA female
OPT.74 Tracking gener	ator
Frequency range:	100 kHz to 3 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) (reference signal level: -10 dBm, frequency: 30 MHz)
Output level switching uncertainly:	±1.0 dB (100 kHz to 1 GHz, output level ≥-30 dBm) ±2.0 dB (100 kHz to 2.6 GHz) ±3.0 dB (100 kHz to 3 GHz) (reference level: -10 dBm)
Spurious output Harmonic: Non-harmonic:	≤-20 dBc (output level: -10 dBm) ≤-30 dBc (output level: -10 dBm)
TG leakage	≤-100 dBm (input ATT: 0dB)
Output impedance: VSWR:	50 Ω (nominal) ≤2 (output level ≤-10 dBm) (typical)
Maximum allowable input level:	+15 dBm ±10 VDC
Mass:	≤1 kg

## **R3182 Specifications**

Frequency	
Frequency range:	9 kHz to 40 GHz
Preamplifier OFF	Harmonic order (N)
band 0:	9 kHz to 3.3 GHz 1
band 1: band 2:	3.2 to 7.1 GHz 1 7 to 14.7 GHz 2
band 3:	14.5 to 27 GHz 4
band 4:	26.5 to 30 GHz 4
band 5:	29.5 to 40 GHz 8
Preamplifier ON	
band 0:	9 kHz to 3.3 GHz 1
Frequency reading accuracy (Start, Stop, CF, Marker):	± (Reading of frequency x Frequency reference accuracy + Span x Span accuracy + RBW x 0.15 + 60 Hz)
Counter	
Resolution:	1 Hz to 1 kHz
Accuracy:	± (Marker frequency x Frequency
	reference accuracy + Residual FM + 1 LSD) (S/N ≥25 dB, span ≤200 MHz)
	(3/14 223 db, 3part \$200 Will2)
Frequency reference accuracy	+2 v 10 <sup>6</sup> /voor
Stability: Temperature stability:	±2 x 10 <sup>-6</sup> /year ±1 x 10 <sup>-5</sup> (0 to +50°C)
	11 X 10 (0 to +30 C)
Frequency span	1 kHz to 40 CHz 0 Hz (zozo ozoz)
Range:	1 kHz to 40 GHz, 0 Hz (zero span) ±1%
Accuracy:	≥±1/0
Residual FM	//O Ham m v NN /400
Zero span:	≤ (60 Hzp-p x N) /100 ms
Noise sideband	- 100 dPa/Uz
Frequency ≤2.6 GHz: Frequency >2.6 GHz:	≤-100 dBc/Hz (at 10 kHz offset, RBW 300 Hz (OPT.27)) ≤-105 dBc/Hz (at 20 kHz offset) ≤ (-98 + 20 loqN) dBc/Hz
rrequerity >2.0 GHz.	(at 10 kHz offset, RBW 300 Hz (OPT.27)) ≤ (-103 + 20 logN) dBc/Hz (at 20 kHz offset)
Resolution bandwidth at 3 dB	
Range:	1 kHz to 3 MHz (1-3-10 sequence)
Accuracy:	±20% 1 kHz to 1 MHz
•	±25% 3 MHz
Selectivity (60 dB:3 dB):	<15:1
QP (6 dB) Range:	1 MHz, 120 kHz, 9 kHz
Video bandwidth:	10 Hz to 3 MHz (1-3-10 sequence)
Amplitude range	
	±30 dRm to displayed average noise level
Measuring range	
Measuring range  Maximum input level	(Input attenuator ≥10 dB)
Measuring range  Maximum input level  Preamplifier OFF:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max.
Measuring range Maximum input level Preamplifier OFF: Preamplifier ON:	(Input attenuator ≥10 dB)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.
Measuring range Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max. 10 x 10 div, 10, 5, 2, 1 dB/div
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max. 10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear: Reference level range Preamplifier OFF:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max. 10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div (Input attenuator 0 to 70 dB)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range Preamplifier OFF: Log:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range Preamplifier OFF: Log:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear: Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 μV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV  0 to 70 dB (10 dB step)  10 ms to 1000 s (Sweep time under 20 ms can be set up as
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 μV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 μV to +707.1 mV  0 to 70 dB (10 dB step)
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON:  Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV  0 to 70 dB (10 dB step)  10 ms to 1000 s (Sweep time under 20 ms can be set up at
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear: Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:  Sweep  Sweep time:	+30 dBm, 0 VDC max. +13 dBm, 0 VDC max. 10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 µV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 µV to +707.1 mV 0 to 70 dB (10 dB step) 10 ms to 1000 s (Sweep time under 20 ms can be set up at span 100 MHz or less) ±2%
Measuring range  Maximum input level Preamplifier OFF: Preamplifier ON: Indication range Log: Linear:  Reference level range Preamplifier OFF: Log: Linear: Preamplifier ON: Log: Linear: Input attenuator range:  Sweep  Sweep time:	(Input attenuator ≥10 dB) +30 dBm, 0 VDC max. +13 dBm, 0 VDC max.  10 x 10 div, 10, 5, 2, 1 dB/div 10% of reference level/div  (Input attenuator 0 to 70 dB) -64 to +60 dBm (0.1 dB step) +141.1 μV to +223.6 V (Input attenuator 0 to 30 dB) -82 to +10 dBm (0.1 dB step) +17.76 μV to +707.1 mV  0 to 70 dB (10 dB step)  10 ms to 1000 s (Sweep time under 20 ms can be set up at span 100 MHz or less)

Dynamic range	
Displayed average noise level:	RBW 1 kHz, VBW 10 Hz, input attenuator 0 dB, f ≥ 10 MHz
Preamplifier OFF	•
10 MHz to 3.3 GHz (band 0):	-117 dBm + 2 f (GHz) dB <sup>-1</sup>
3.2 to 7.1 GHz (band 1):	-114 dBm <sup>-1</sup>
7 to 14.7 GHz (band 2):	-112 dBm <sup>-1</sup>
14.5 to 27 GHz (band 3):	-110 dBm <sup>-1</sup>
26.5 to 30 GHz (band 4):	-107 dBm <sup>-1</sup>
29.5 to 40 GHz (band 5):	-106 dBm <sup>*1</sup>
Preamplifier ON	
1 MHz to 3.3 GHz:	-132 dBm + 3 f (GHz) dB
1 dB gain compression	
Preamplifier OFF	
200 MHz to 3.3 GHz (band 0):	>0 dBm (mixer input level)
3.2 to 40 GHz (band 1 to 5):	>-5 dBm (mixer input level)
Preamplifier ON	(Input attenuator 0 to 30 dB)
200 MHz to 3.3 GHz (band 0):	>-25 dBm (RF input level)

# Spurious response: preamplifier OFF

Second harmonic distortion:

Frequency range	Mixer level	Distortion level
100 to 800 MHz	-30 dBm	≤-70 dBc
≥800 MHz (band 0)	-30 dBm	≤-80 dBc
≥3.3 GHz	-10 dBm	≤-95 dBc

Third order intermodulation
distortion:

stortion:	≤-80 dBc (200 MHz to 3.3 GHz, band 0)
	≤-75 dBc (3.2 to 30 GHz, band 1 to 4)
	≤-70 dBc (29.5 to 40 GHz, band 5)
	(mixer input level -30 dBm,
	two signal difference >50 kHz)

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Out of band response:	<-70 dBc (10 MHz ≤ f ≤18 GHz)
	<-65 dBc (18 GHz < f ≤ 26.5 GHz)
	<-60 dBc (26.5 GHz < f ≤34 GHz)
	<-50 dBc (34 GHz < f ≤ 40 GHz)

(Input terminated 50  $\Omega$  , input attenuator Residual response: 0 dB, f ≥1 MHz)

Preamplifier OFF: ≤-100 dBm (band 0) ≤-90 dBm (band 1 to 5) ≤-105 dBm (band 0) Preamplifier ON:

## **Amplitude accuracy**

Frequency response

(after calibration and preselector peak, attenuator 10 dB) Preamplifier OFF

	Eroguopov rango	Relative		Absolute <sup>*2</sup>	
Frequency range	20 to 30°C	0 to 50°C	20 to 30°C	0 to 50°C	
	100 kHz to 3 GHz	±0.5 dB	±1.0 dB	±0.6 dB	±1.0 dB
	9 kHz to 3.3 GHz	±1.5 dB	±2.0 dB	±1.5 dB	±2.0 dB
	3.3 to 7.1 GHz	±1.6 dB	±1.8 dB	±1.8 dB	±2.5 dB
	7.1 to 14.7 GHz	±1.8 dB	±2.0 dB	±2.0 dB	±3.0 dB
	14.7 to 26.5 GHz	±2.5 dB	±3.0 dB	±3.0 dB	±4.0 dB
	27 to 30 GHz	±3.0 dB	±3.5 dB	±3.5 dB	±4.5 dB
	30 to 40 GHz	±3.5 dB	±4.0 dB	±4.0 dB	±5.0 dB

### Preamplifier ON

Frequency range	Relative		Absolute*2	
	20 to 30°C	0 to 50°C	20 to 30°C	0 to 50°C
100 kHz to 2.7 GHz 9 kHz to 3.3 GHz	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB	±1.0 dB ±2.0 dB

Calibration signal level accuracy: -20 dBm ±0.3 dB

IF gain error

(after automatic calibration): ±0.5 dB

Scale indication accuracy (after automatic calibration)

Log: ±1.5/90 dB, ±1.0/10 dB, ±0.2/1 dB

±5% of reference level Liner:

<sup>\*1:</sup> For a temperature range of 20 to 30°C. Add 2 dB for a temperature range of 0 to 50°C.

<sup>\*2:</sup> In reference to 30 MHz calibration signal.

Input ATT switching error:	≤±1.1/10 dB, 2 dB max. (9 kHz to 12 GHz)	Options OPT.16 External mixer (26.5 to 40 GHz)			
	≤±1.3/10 dB, 2.5 dB max. (12 to 18 GHz)	Frequency range:	26.5 to 40 GHz		
	≤±1.8/10 dB, 3.5 dB max. (18 to 26.5GHz) ≤±2.2/10 dB, 4 dB max. (26.5 to 40GHz)	Average noise level:	≤- 99 dBm (typical value at RBW 1 kHz, VBW 10 Hz)		
	in reference to an attenuation of 10dB	Frequency response:	±5 dB (typical)		
Book Book of Alli	at 30 MHz	1 dB gain squeeze:	-1 dBm		
Resolution bandwidth switchinglevel error		Maximum input level:	+20 dBm (continuous wave (CW) power)		
(after automatic calibration):	±0.5 dB	OPT.17 External mixer (	40 to 60 GHz)		
Total level accuracy Preamplifier OFF:	±1.5 dB (REF = -50 to 0 dBm, ATT = 10 dB, 2 dB/div, RBW = 300 kHz, f = 100 kHz	Frequency range:	40 to 60 GHz		
·		Average noise level:	≤- 93 dBm (typical value at RBW 1 kHz, VBW 10 Hz)		
	to 3 GHz, after automatic calibration)	Frequency response:	±5 dB (typical)		
1/0		1 dB gain squeeze:	-1 dBm		
RF input		Maximum input level:	+20 dBm (CW power)		
Connector:	K connector (male)		· · · · · · · · · · · · · · · · · · ·		
Impedance: VSWR (at tuned frequency)	50 $\Omega$ (nominal)	OPT.18 External mixer (50 to 75 GHz)			
Preamplifier OFF:	<1.5 : 1 (9 kHz to 3.3 GHz, band 0)	Frequency range:	50 to 75 GHz		
	(typical) <2:1 (3.2 to 26.5 GHz, band 1 to 3)	Average noise level:	≤- 90 dBm (typical value at RBW 1 kHz, VBW 10 Hz)		
	(typical) <2.2 : 1 (26.5 to 40 GHz, band 4, 5)	Frequency response:	±5 dB (typical)		
	(typical)	1 dB gain squeeze:	-6 dBm		
Preamplifier ON:	with input ATT 10 to 70 dB < 2.5 : 1 (9 kHz to 3.3 GHz, band 0)	Maximum input level:	+20 dBm (CW power)		
	(typical)	OPT.19 External mixer (75 to 110 GHz)			
Probe power:	±12 V (nominal), 4-pin connector	Frequency range:	75 to 110 GHz		
Calibration output signal:	BNC female, 50 Ω (nominal) 30 MHz, -20 dBm	Average noise level:	≤- 85 dBm (75 to 85 GHz) ≤- 80 dBm (85 to 110 GHz)		
External mixer local output Connector:	SAM female		(typical value at RBW 1 kHz, VBW 10 Hz)		
Impedance:	50 $\Omega$ (nominal)	Frequency response:	±5 dB (typical)		
Frequency range: Output level:	4.0 to 7.6 GHz >+8 dBm	1 dB gain squeeze:	-6 dBm		
10MHz reference input:	BNC female, 500 Ω (nominal)	Maximum input level:	+20 dBm (CW power)		
	-10 to +10 dBm	OPT.20 High-stability frequency reference			
External trigger input:	BNC female	Reference frequency source	accuracy		
Y axis output:	BNC female Approx. 2 V in full scale (10 dB/div)	Stability:	±2 x 10 <sup>-8</sup> /day ±1 x 10 <sup>-7</sup> /year		
Phone output:	Small size monophonic female	Warm-up drift (nominal):	±5 x 10° (typical) (25°C, 10 minutes after tuning the		
GPIB interface:	IEEE-488 BUS connector		power on)		
Serial interface:	D-Sub 9-pins	Temperature drift:	±5 x 10 <sup>-8</sup> (0 to +40°C, with reference to +25°C)		
Printer interface:	D-Sub 25-pins, ESC/P, ESC/P-R, PCL		(0 to +40°C, with reference to +25°C)		
Video output:	VGA (15-pins, female)	OPT.27 Narrow-band resolution bandwidth			
Floppy disk:	3.5-inch, MS-DOS format	3-dB resolution bandwidth:	300 Hz, 100 Hz, 30Hz		
1117		Bandwidth accuracy:	±20%		
General specifications		6-dB resolution bandwidth:	200 Hz		
Operating temperature:	0 to +50°C Relative humidity 85% or less	OPT.29 Time-domain hig	gh-speed sweeps		
	(no condensation)	Sweep time:	50 μs to 10 ms		
Storage temperature:	-20 to +60°C, relative humidity 85% or less	Sweep time accuracy:	±1%		
Power source: 100 VAC: 200 VAC:	Automatic switching to 100 or 200 VAC 100 to 120 VAC, 50 to 60 Hz 220 to 240 VAC, 50 to 60 Hz	Trace detector: Trace point:	Sample 501		
Power consumption:	<200 VA				
Dimension:	Approx. 424 (W) x 177 (H) x 300 (D) mm (excluding feet and connectors)				
Mass (without option):	<18 kg (excluding options, cover, and accessories)				
		1			

#### OPT.73 Wide-range FM demodulation

Internal mixer mode

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: Linearity error\*:

Offset error\*:

2.5 MHz, 1 MHz, 500 kHz, 250 kHz, 100 kHz, 50 kHz, 25 kHz, 10 kHz ≤ (2 % of measuring range) ≤ (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)

External mixer mode (one of OPT.16, 17, 18 or 19 is required)

FM deviation

Measuring range:

500 MHz, 250 MHz, 100 MHz, 50 MHz, 25 MHz, 10 MHz, 5 MHz, 2.5 MHz, 1 MHz. 500 kHz. 250 kHz. 100 kHz. 50 kHz, 25 kHz, 10 kHz

Linearity error\*: Offset error\*:

≤ (2 % of measuring range) ≤ (4 % of measuring range + K + Readout of frequency x Frequency

reference accuracy)

K; 128 kHz (measuring range 500 MHz

to 5 MHz)

8 kHz (measuring range 2.5 MHz to

250 kMz)

2 kHz (measuring range 100 kHz to

10 kMz)

**Demodulation frequency** 

bandwidth (3 dB): ≥300 kHz (nominal)

Specifications may change without notification.

<sup>\*</sup> These errors are values obtained by executing "FM Demod ALL CAL" software, after warming up the R3172/3182 and optional mixer for 30 minutes or more.