

PANORAMA vector network analyzers

Features

- Frequency range from 0.3/10 MHz to 13.5/26.5 GHz¹
- Dynamic range is 145 dB at 1 Hz intermediate-frequency filter band
- Wide output power setting range from -90 dBm to +12/+15 dBm
- Low noise level of trace 0.002 dB root-mean-square error for 1 kHz intermediate-frequency filter band
- Variations in waveguide path (TRL calibration)



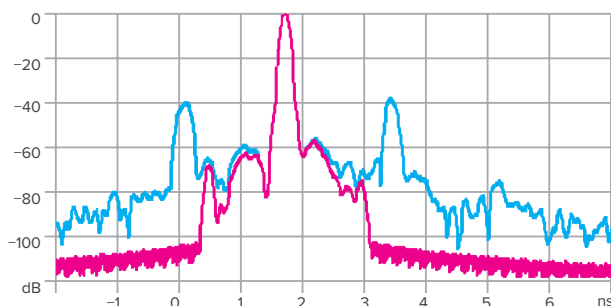
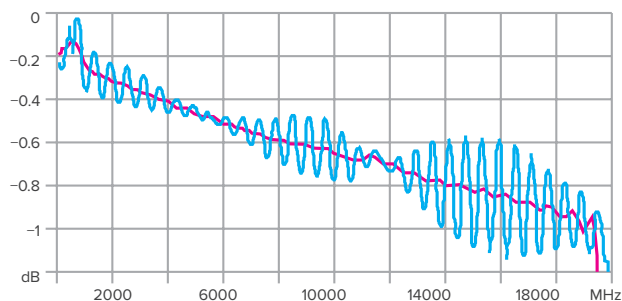
Description

New generation of R4213 and R4226 vector network analyzers (VNA), based on modular architecture, provides high dynamic range and highest output power in their class, ensuring high operation speed and reliability. State-of-the-art proprietary software/hardware solutions provide combination of the wide range of microwave measurements in a single device, and make Micran VNAs a perfect solution for complex tasks, for both development and commercial production of microwave devices. R4213/R4226 are used for analyzing, tuning, testing, monitoring and manufacture of high-frequency and microwave devices used in radio electronics, communications, radar location, measuring equipment. Control of the VNA with SCPI commands provides integration of R4M with automated instrumentation systems of various complexity.

Capabilities and applications

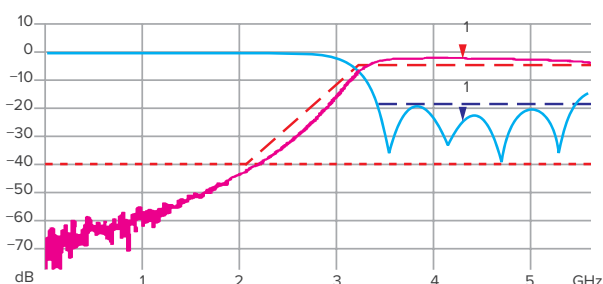
Time domain analysis and filtration (VOP option)

- Time domain analysis allows you to observe frequency characteristics, measured by VNA, in time domain. Which provides display of responses passed through DUT or reflected from DUT vs. time or distance.
- Time domain filtration provides suppression of interfering responses caused by, for example, re-reflections, or allows to detect useful network responses, then perform reverse conversion to frequency domain and obtain interference-free measurements.



Generation of limiting lines

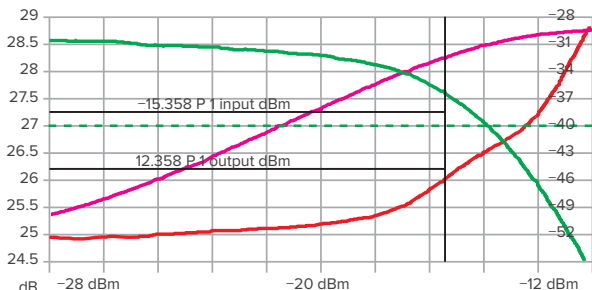
- The lines are generated to analyze exceedance of measured parameters beyond predefined limits.
- Convenient capability allowing rejection of defective devices during commercial production.
- Definition of limiting lines by tables or direct drawing on the graph.



¹ Hereinafter, for R4213/R4226.

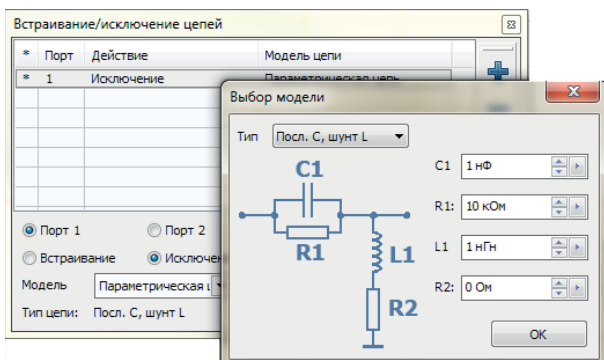
Frequency and/or power sweep

- Continuous sweep/List sweep.
- Measurement of gain compression, output power level in compression point and amplitude-phase conversion.



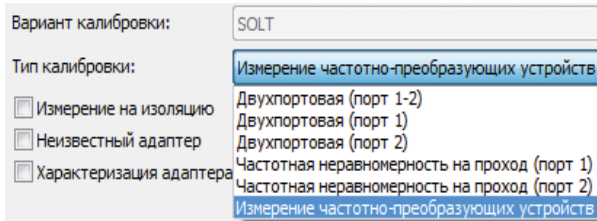
Integration/Removal

- Network integration/removal to transfer calibration plane, including parametric description of circuits.



Extended calibration

- TRL/LRL/TRM/LRM calibration for plate measurements.
- TRL/SOLT calibration for waveguide path measurements.
- Source/receiver calibration, using external power meters for measurements that require absolute power analysis.
- SOLT, 1-port, 2-port calibration of frequency flatness.
- Use of automatic electronic calibrator.
- Vector calibration to measure mixer parameters.
- Calibration to measure noise figure, considering incomplete matching within the source.



Mixers measurement

- $|C_{21}|$ conversion ratio, C_{21} phase, group delay time.
- Input/output matching, insulation measurement.
- Measurement of Sc_{21} scalar conversion ratio.
- Vector calibration.
- Heterodyne power measurement.
- Interactive calibration assistant.

High output power and wide output power variation range

- Output power level from -90 dBm to $+15$ dBm with built-in attenuator.
- Measurement of dynamic characteristics of amplifiers.

Pulse measurements (IIP option)

- Minimum time required to measure S-parameter (and minimum pulse duration, accordingly) is 40 ns. Pulse shape is measured by shifting measurement window (with step ≥ 10 ns).
- Pulse mode measurements: point-in-pulse, pulse-profile.

Receiver frequency shift (SCHP option)

- Control of receiver frequency irrespective of probing signal source frequency. The option provides measurements at any frequency when analyzing amplifiers, mixers and frequency conversion devices.

Automatic calibrator support

- Makes calibration easier.
- Wide range of automatic calibrators, developed by Micran, with various output connector types.
- Automatic detection of connected ports.

Direct access to generator and receiver at the front panel (DPA option)

- The option provides additional attenuation, amplification or filtration of source signals or receiver signals.

Software

- User-friendly interface.
- Adjustable marker system.
- Up to 4 measurement diagrams.
- Unlimited number of measurement traces and memory traces.
- Flexible reporting system.
- Formula editor for complicated mathematical operations.
- Hidden display mode is supported (SRP option), providing protection of confidential data on DUT operating frequencies by hiding the displayed frequency spectrum.

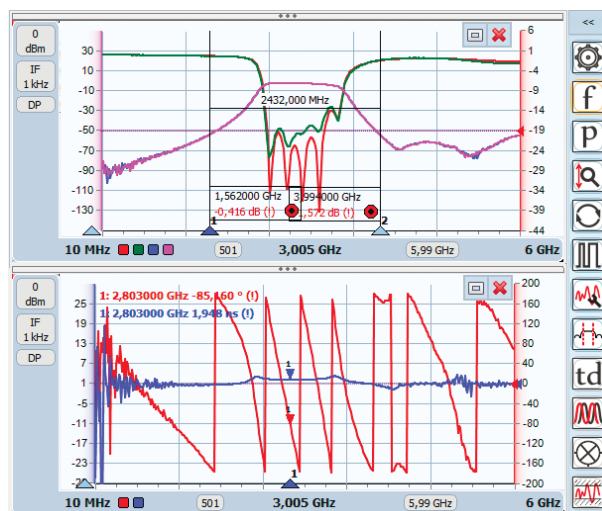
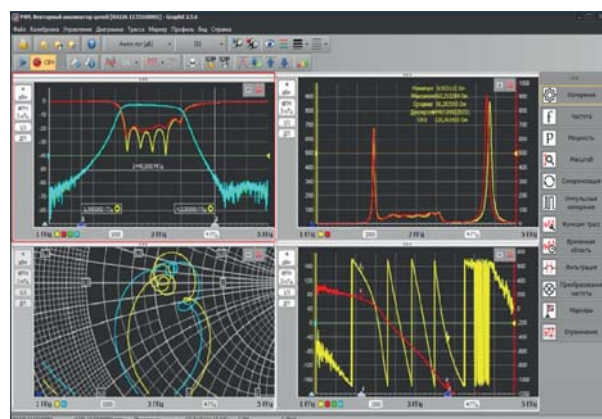
Documented SCPI compatible program interface provides device control with third-party software (LabVIEW, MS Excel etc.). Adaptive synchronization system provides joint operation of VNA and other devices included in measuring systems.

Built-in switch of reference channel (SPA option)

- The option provides variation of converter parameters with vector calibration.

Port configuration

- The option provides measurements in the path with impedance that differs from measurement path impedance.



Specifications

	R4213	R4226
Frequency range	300 kHz ... 13.5 GHz	10 MHz ... 26.5 GHz
Number of measuring ports	2 (50 Ohm)	
Type of output microwave connectors of measuring ports	Type III (or N)	NMD 3.5 mm
Dynamic range for 10 Hz intermediate-frequency filter	135 dB	
Receiver compression, 0.1 dB	+15 dBm	+12 dBm
Output power setting range (DMA option)	-90 to +12 dBm	-90 to +15 dBm
Intermediate-frequency filter band, max/min	30 kHz / 10 Hz	100 kHz / 10 Hz
Frequency setting error	$\pm 2 \times 10^{-6}$	
Output frequency step	1 Hz	
Output power setting error	± 0.5 dB	± 1 dB
Output signal power setting increment	0.05 dB	
Harmonic distortion	-25 dBc	
Nonharmonic distortion, max.	-30 dBc	
Trace noise level, root-mean-square error for 1 kHz intermediate-frequency filter	0.002 dB	
Trace stability	0.01 dB/°C	
Supported calibration types	SOLT, Adapter removal/insertion, ECal, TRL, Unknown thru, Waveguide, Power cal, Receiver cal, SMC	SOLT, Adapter removal/insertion, ECal, TRL, Unknown thru, Waveguide, Power cal, Receiver cal, SMC, VMC
Time domain analysis and filtration	+	+
Built-in attenuator (DMA option)	+	+
Noise figure measurement with low-noise receivers	-	+
Mixer measurement with scalar calibration	+	+
Mixer measurement with vector calibration	-	+
Pulse measurements	+	+
Dynamic measurement	+	+
Direct access to generator and receiver (DPA option)	+	+
Receiver frequency shift	+	+
Network integration/removal	+	+
Power consumption, max.	42 W	90 W
Dimensions, LxWxH	380 × 350 × 160 mm	
Weight, max	5 kg	8.5 kg

Effective parameters of R4213 for calibration with NKMM kits, dB

	300 kHz ... 9 GHz	9 GHz ... 13.5 GHz
Directivity	48	46
Source matching	44	42
Load matching	46	44

Effective parameters of R4226 for calibration with NKMM kits, dB

	10 MHz ... 9 GHz	9 GHz ... 18 GHz	18 GHz ... 26.5 GHz
Directivity	48	46	42
Source matching	44	42	40
Load matching	46	44	40

Ordering information

Versions

R4213/1	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 01R option
R4213/2	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 11R option
R4213/3	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 01R and DPA options
R4213/4	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 11R and DPA options
R4213/5	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 01R and DMA options
R4213/6	Vector network analyzer, 0.3 MHz ... 13.5 GHz, 11R and DMA options
R4226/1	Vector network analyzer, 10 MHz ... 26.5 GHz
R4226/2	Vector network analyzer, 10 MHz ... 26.5 GHz, DPA option
R4226/3	Vector network analyzer, 10 MHz ... 26.5 GHz, DMA option
R4226/4	Vector network analyzer, 10 MHz ... 26.5 GHz, DPA and SPA options
R4226/5	Vector network analyzer, 10 MHz ... 26.5 GHz, DMA and SPA options

Software options

SRP	Hidden display mode
VOP	Time domain analysis and filtration
SCHP	Receiver frequency shift
IIP	Pulse-mode measurements

Hardware options

DPA	Direct access to generator and receiver.
01R	Output connector, type III (female)
11R	Output connector, type N (female)
DMA	Extended dynamic range
SPA	Built-in reference receiver switch
R4M-EK4-18-01R-01	Automatic calibrator, type III (female) – type III (male)
R4M-EK4-18-01R-01R	Automatic calibrator, type III (female) – type III (female)
R4M-EK4-18-01-01	Automatic calibrator, type III (male) – type III (male)
R4M-EK4-18-11R-11	Automatic calibrator, type N (female) – type N (male)
R4M-EK4-18-11R-11R	Automatic calibrator, type N (female) – type N (female)
R4M-EK4-18A-01R-01	Automatic calibrator for R4213, type III (female) – type III (male)
R4M-EK4-18A-01R-01R	Automatic calibrator for R4213, type III (female) – type III (female)
R4M-EK4-18A-01-01	Automatic calibrator for R4213, type III (male) – type III (male)
R4M-EK4-18A-11R-11	Automatic calibrator for R4213, type N (female) – type N (male)
R4M-EK4-18A-11R-11R	Automatic calibrator for R4213, type N (female) – type N (female)
R4M-EK4-18A-11-11	Automatic calibrator for R4213, type N (male) – type N (male)
R4M-EK4-18-11-11	Automatic calibrator, type N (male) – type N (male)
R4M-EK4-20-13-13	Automatic calibrator, 3.5 mm (male) – 3.5 mm (male)
R4M-EK4-20-13R-13	Automatic calibrator, 3.5 mm (female) – 3.5 mm (male)
R4M-EK4-20-13R-13R	Automatic calibrator, 3.5 mm (female) – 3.5 mm (female)
R4M-EK4-20-03R-03R	Automatic calibrator, type IX, ver. 3 (female) – type IX, ver. 3 (female)
R4M-EK4-20-03-03	Automatic calibrator, type IX, ver. 3 (male) – type IX, ver. 3 (male)
R4M-EK4-20-03R-03	Automatic calibrator, type IX, ver. 3 (female) – type IX, ver. 3 (male)

Calibration kits for vector network analyzers

NKMM-13-13R	Calibration kit with 3.5 mm connectors
NKMM-01-01R	Calibration kit with type III connectors
NKMM-01-01R/A	Calibration kit with type III connectors (incomplete version for R4213)
NKMM-11-11R/A	Calibration kit with type N connectors (incomplete version for R4213)
NKMM-03-03R	Calibration kit with type IX, ver. 3 connectors
NKMM-11-11R	Calibration kit with type N connectors

3.5/1.52 mm path phase-stable microwave cables

KSF26-13RN-13N-700	Phase-stable microwave cable, 3.5 mm NMD (female) – 3.5 mm NMD (male) connectors, 700 mm
KSF26-13RN-13N-1000	Phase-stable microwave cable, 3.5 mm NMD (female) – 3.5 mm NMD (male) connectors, 1000 mm