

# NETWORK ANALYZER 300kHz~3.2GHz

## Protek A333



**Protek**

# Network Analyzer 3.2GHz

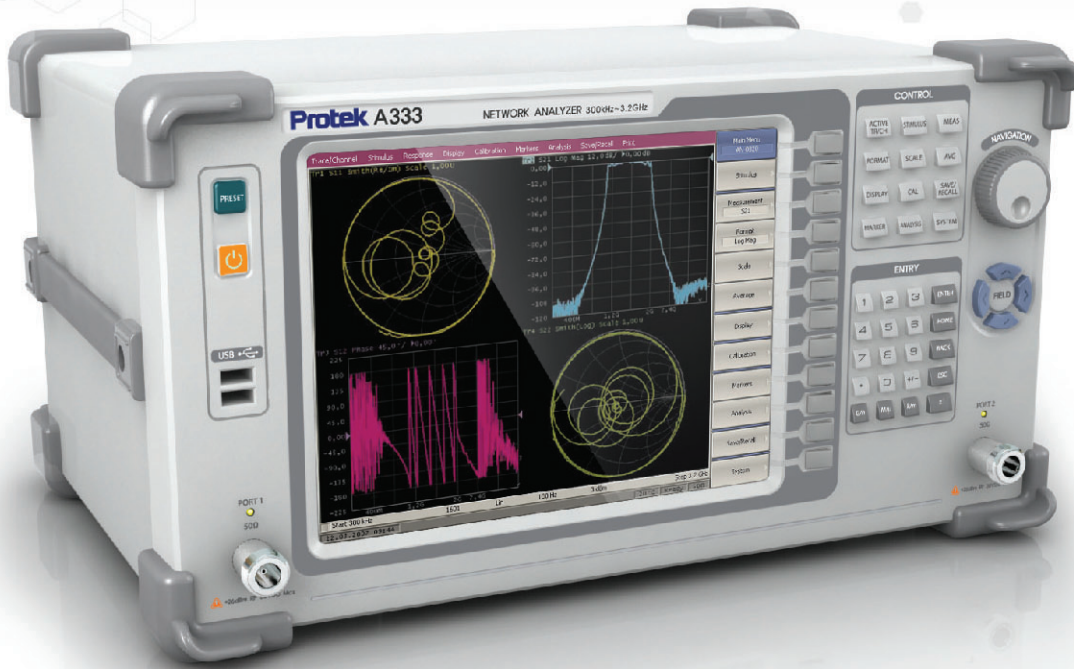
Frequency range 300kHz to 3.2GHz Frequency resolution 1mHz IF bandwidth settings 1Hz to 30kHz  
Power range -45dBm to +10dBm Power accuracy <1.0 dB Display 10.4 inch TFT Color LCD(800x600) Touch Screen  
User Interface USB 2.0, Ethernet, Key Board, Mouse, Printer, Video

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## Specifications

Specifications apply under the following conditions:

- ▶ 40 minutes warm-up time at the ambient temperature.
- ▶ Environmental temperature of  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , with less than  $1^{\circ}\text{C}$  deviation from the calibration temperature.
- ▶ No averaging applied to data.
- ▶ Two port calibration is performed.

## Measurement accuracy

### Accuracy of transmission measurement (magnitude/phase)

Specifications are based on a matched DUT, a measurement bandwidth of 1 Hz, and a nominal source power of -5 dBm	+15 to +5 dB	0.2 dB/ $2.0^{\circ}$
	+ 5 to -50 dB	0.1 dB/ $1.0^{\circ}$
	-50 to -70 dB	0.2 dB/ $2.0^{\circ}$
	-70 to -90 dB	1.0 dB/ $6.0^{\circ}$

### Accuracy of reflection measurement (magnitude/phase)

Specifications are based on a matched DUT, a measurement bandwidth of 1 Hz, and a nominal source power of -5 dBm	0 to -15 dB	0.4 dB/ $4.0^{\circ}$
	-15 to -25 dB	1.5 dB/ $7.0^{\circ}$
	-25 to -35 dB	4 dB/ $22.0^{\circ}$

## Trace stability

Temperature dependence per one degree of the temperature variation	0.02 dB
Trace noise magnitude IF bandwidth 3 kHz	0.001 dB rms

## Measurement range

Frequency range	300kHz to 3.2 GHz
Impedance	$50 \Omega$ ( $75 \Omega$ )
Test port Connectors	N-type, female
Number of test ports	2
Frequency accuracy	$\pm 5$ ppm
Frequency resolution	1mHz
Number of test points user-selectable	2 to 10001
IF bandwidth settings 1/1,5/2/3/5/7/10 step	1.0 Hz to 30 kHz
Dynamic range IF bandwidth 10 Hz	2 to 3200 MHz $> 125$ dB, typ. 130dB
Measurement time per point 30 kHz measurement bandwidth	125 $\mu\text{s}$

## Test port output

Power range	-45 to +10 dBm
Power accuracy	$< 1.0$ dB
Power resolution	0.05 dB
Harmonic distortion	-30 dBc

## Test port input

Match without system error correction	$> 25$ dB
Damage level	+26 dBm
Damage DC voltage	35 V

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**TFT Color LCD (10.4-inch)**  
Daylight viewable high resolution LCD display

**POWER&LED**  
Power On/Off  
Green LED:  
Power On Status  
Red LED:  
External power

**USB**  
Instrument states, calibration data, and trace data can be stored on an external USB drive.



**Screen Menu**  
Display selectable menu in connection with function keys or soft keys

**KNOB / ARROW**  
Move marker positions or items on the table list

**ENTER**  
Input numeric values

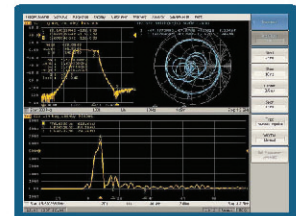
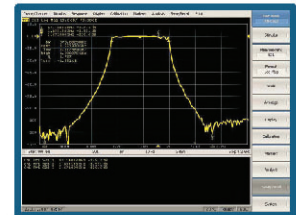
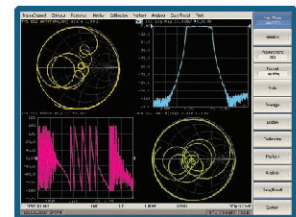
**Soft Key**  
Select menu displayed on the screen

## Measurement capabilities

Number of measurement channels	Up to 16 independent measurement channels. A measurement channel is coupled to stimulus response settings including frequency range and number of points.
Number of windows	Each measurement channel has a display window.
Number of traces	Up to 16 display windows (channels) can be displayed. 16 data traces and 16 memory traces per channel
Measurement parameters	$S_{11}$ , $S_{21}$ , $S_{12}$ , $S_{22}$
Measurement parameter conversion	Available to convert S-parameters into reflection impedance, transmission
Data formats	impedance, reflection admittance, transmission admittance, and 1/S. Log magnitude, linear magnitude, phase, expanded phase, group delay, SWR, real, imaginary, Smith chart, polar.
Data markers	10 independent markers per trace. Reference marker available for delta marker operation. Smith chart format includes 5 marker formats: linear magnitude/phase, log magnitude/phase, real/imaginary, $R + jX$ , and $G + jB$ . Polar chart format includes 3 marker formats: linear magnitude/phase, log magnitude/phase, and real/imaginary.

## External/Internal reference signal I/O

Frequency	10 MHz
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## Marker functions

Marker search	Max value, Min value, peak, peak left, peak right, target, target left, target right, multi-peak, multi-target, bandwidth parameters with user-defined bandwidth values.
Marker-to functions	Set start, stop, center to active marker stimulus value; set reference to active marker response value; set electrical delay to group delay at active marker.
Search range	User definable.
Tracking	Performs marker search continuously or on demand.

## Time domain functions

Transformation	Selectable transformation type from bandpass, lowpass impulse, lowpass step. Selectable window from maximum, normal and minimum.
Gated functions	Selectable gated filter type from bandpass, notch. Selectable gate shape from maximum, normal and wide.

## Source control

Sweep type	Linear sweep, segment sweep, log sweep and power sweep.
Segment sweep	Define independent sweep segments. Set number of points, test port power levels, IF bandwidth, delay time independently for each segment.
Sweep trigger	Set to continuous, hold, or single, sweep
Power	Set source power from -45 dBm to 10 dBm. The power slope function compensates source power level error with internal, external, manual trigger.

## Operating environment

Temperature	+5 to +40°C
Dimensions (WxHxD)	426x222x270mm
Weight	10.6kg
Power supply	100 to 240 VAC / 47 to 63Hz

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## Trace functions

Display data	Display current measurement data, memory data, or current measurement and memory data simultaneously.
Trace math	Vector addition, subtraction, multiplication or division of measured complex values and memory data.
Title	Add custom title to each channel window. Titles are printed on hardcopies of displayed measurements.
Autoscale	Automatically selects scale resolution and reference value to vertically center the trace.
Electrical delay	Offset measured phase or group delay by a defined amount of electrical delay, in seconds.
Phase Offset	Offset measured phase or group delay by a defined amount in degrees.
Statistics	Calculates and displays mean, standard deviation and peak-to-peak deviation of the data trace.

## Data accuracy enhancement

Measurement calibration	Measurement calibration significantly reduces measurement uncertainty due to errors caused by system directivity, source and load match, tracking and crosstalk. Full 2-port calibration removes all the systematic errors for the related test ports to obtain the most accurate measurements.
Response calibration	Simultaneous magnitude and phase correction of frequency response errors for either reflection or transmission measurements.
Response calibration and isolation	Compensates for frequency response and crosstalk errors of transmission measurements, and frequency response and directivity errors of reflection measurements.
Enhanced response calibration	Compensates for frequency response and source match errors.
One-port calibration	Compensates for directivity, frequency response and source match errors.
Full 2-port calibration	Compensates for directivity, source match, reflection tracking, load match, transmission tracking and crosstalk. Crosstalk calibration can be omitted.
Interpolated error correction	With any type of accuracy enhancement applied, interpolated mode recalculates the error coefficients when the test frequencies are changed. The number of points can be increased or decreased and the start/stop frequencies can be changed.
Reference port extension	Redefine the measurement plane from the plane where the calibration was done.

## Other capabilities

Internal hard disk drive	Store and recall instrument states, calibration data, and trace data on internal hard drive. Trace data can be saved in CSV (comma separated value) format. Instrument states include all control settings, limit lines, segment sweep tables, and memory trace data.
USB	Instrument states, calibration data, and trace data can be stored on an external USB drive.
Screen hardcopy	Printouts of instrument data are directly produced on a printer. The analyzer provides USB and parallel interfaces.
Familiar graphical user interface	The A333 analyzer employs a graphical user interface based on Windows. There are three ways to operate the instrument manually: you can use a hardkey interface, a touch screen interface (optional) or a mouse interface.
Limit lines	Define the test limit lines that appear on the display for pass/fail testing. Defined limits may be any combination of horizontal/sloping lines and discrete data points.

## Programming function

COM/DCOM Automation

## Remote Control

LAN, GPIB (optional)



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