

DATA SHEET

E5063A ENA Vector Network Analyzer

100 kHz to 500 M/1.5 G/3 G/4.5 G/6.5 G/8.5 G/14 G/18 GHz



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Definitions

Specification (spec.):

Warranted performance. All specifications apply at 23 °C (± 5 °C), unless otherwise stated, and 90 minutes after the instrument has been turned on. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Typical (typ.):

Expected performance of an average unit which does not include guardbands. It is not covered by the product warranty.

General characteristics:

A general, descriptive term that does not imply a level of performance.

Boundary Conditions

In this data sheet, boundary conditions are given for the specifications. For example, system dynamic range is 68 dB with the following boundary condition.

Frequency: 300 kHz

IF bandwidth: 3 kHz

If the same boundary conditions fall under more than one category in a table, apply the best value.

Calibration Kits and ECal modules

This data sheet also provides technical specifications for the following calibration kits and ECal modules. For models not listed in this data sheet, please download the free uncertainty calculator from www.keysight.com/find/na_calculator to generate the curves for your calibration kit.

- 85032F Calibration kit
- 85033E Calibration kit
- 85052D Calibration kit
- 85092C Electronic calibration (ECal) module
- 85093C Electronic calibration (ECal) module
- N4691B Electronic calibration (ECal) module

Corrected System Performance

The specifications in this section apply to measurements made with the Keysight Technologies, Inc. E5063A vector network analyzer under the following conditions:

- No averaging applied to data
- Environmental temperature of 23 °C (± 5 °C) with less than 1 °C deviation from the calibration temperature
- Response and isolation calibration performed

System Dynamic Range

| Description | Specification | Typical |
|--|---------------|---------|
| System dynamic range at test port ¹ | | |
| (IF Bandwidth = 3 kHz) | | |
| 100 kHz to 300 kHz | 63 dB | |
| 300 kHz to 8.5 MHz | 68 dB | |
| 8.5 to 100 MHz | 91 dB | |
| 100 MHz to 4.34 GHz | 92 dB | |
| 4.34 to 8.5 GHz | 81 dB | |
| 8.5 to 13 GHz | 75 dB | |
| 13 to 16 GHz | 65 dB | |
| 16 to 18 GHz | 62 dB | |
| (IF Bandwidth = 10 Hz) | | |
| 50 kHz to 100 kHz | | 88 dB |
| 100 kHz to 300 kHz | 88 dB | 92 dB |
| 300 kHz to 8.5 MHz | 93 dB | 97 dB |
| 8.5 to 100 MHz | 116 dB | 122 dB |
| 100 MHz to 4.34 GHz | 117 dB | 122 dB |
| 4.34 to 8.5 GHz | 106 dB | 112 dB |
| 8.5 to 13 GHz | 100 dB | 106 dB |
| 13 to 16 GHz | 90 dB | 100 dB |
| 16 to 18 GHz | 87 dB | 93 dB |

1. The test port dynamic range is calculated as the difference between the test port rms noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainty and interfering signals into account.

Corrected System Performance with Calibration Kit

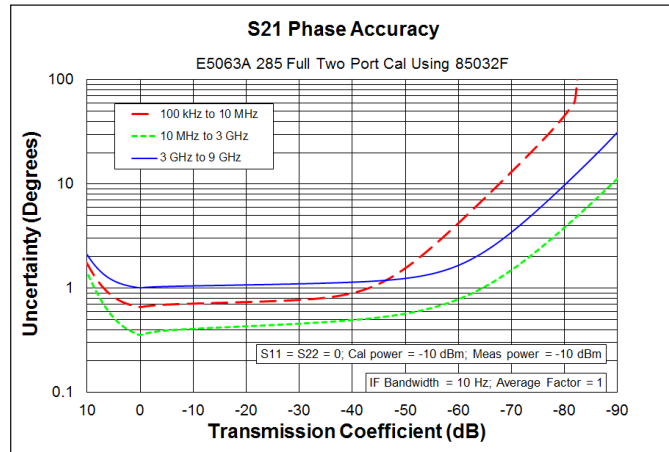
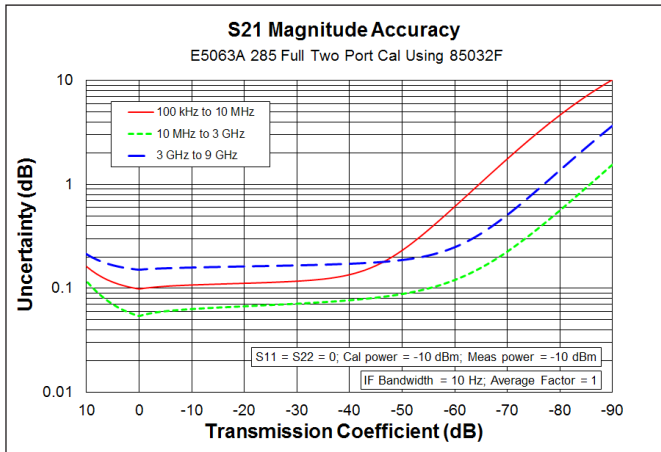
Corrected system performance with type-N device connectors, 85032F calibration kit

Vector network analyzer : E5063A
 Calibration kit : 85032F (Type-N, 50 Ω)
 Calibration : Full 2-port

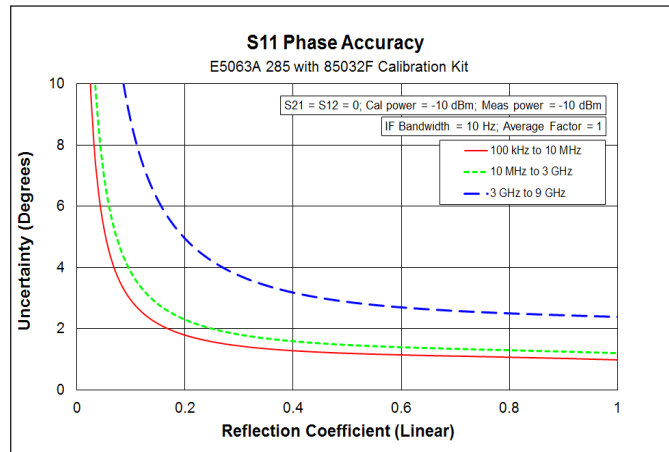
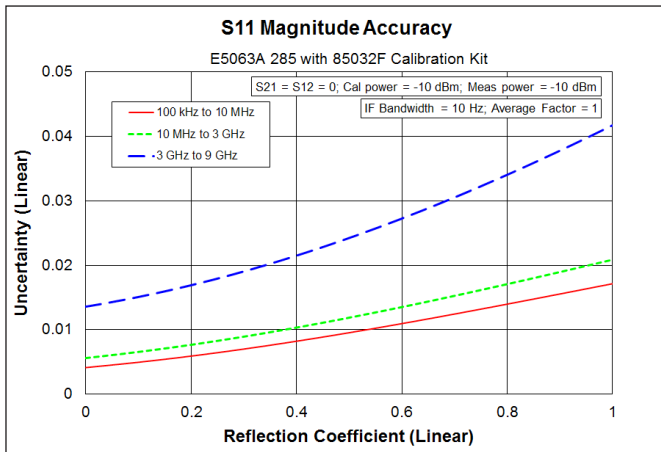
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration performed

| Description | Specification (dB) | | |
|-----------------------|--------------------------------|-----------------|------------|
| | 100 kHz to 10 MHz ¹ | 10 MHz to 3 GHz | 3 to 9 GHz |
| Directivity | 49 | 46 | 38 |
| Source match | 41 | 40 | 35 |
| Load match | 47 | 46 | 36 |
| Reflection tracking | ± 0.011 | ± 0.021 | ± 0.054 |
| Transmission tracking | ± 0.082 | ± 0.037 | ± 0.128 |

Transmission uncertainty (specification)²



Reflection uncertainty (specification)²



1. The performance from 50 kHz to 100 kHz is the same with one from 100 kHz to 10 MHz as typical.
2. Applies to the units with Serial Number Prefix MY542/SG542 and above

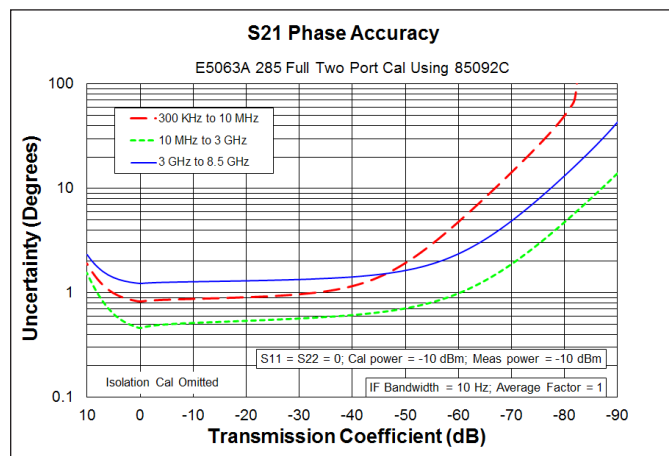
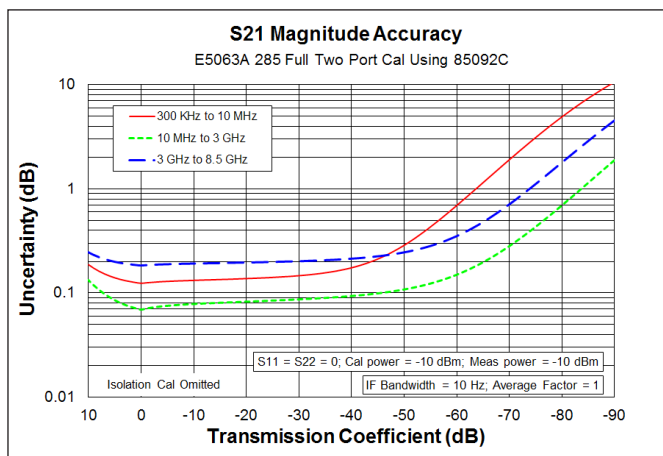
Corrected system performance with type-N device connectors, 85092C electronic calibration (ECal) module

Vector network analyzer : E5063A
 Calibration kit : 85092C (Type-N, 50 Ω) Electronic calibration (ECal) module
 Calibration : Full 2-port

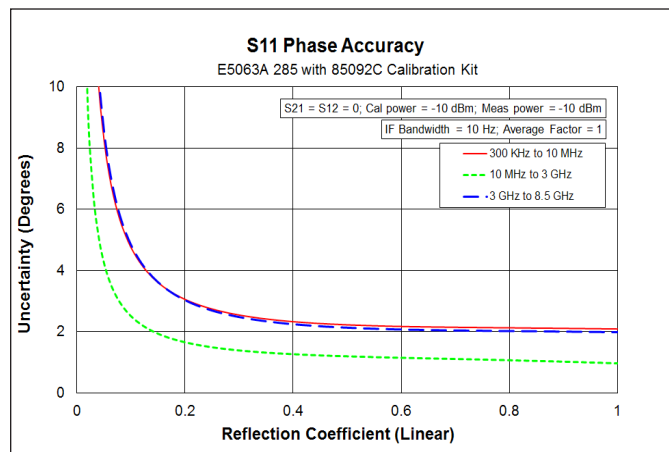
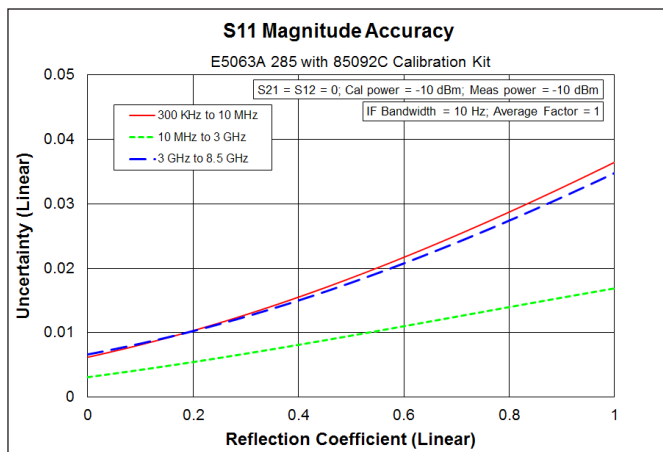
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration is not performed

| Description | Specification (dB) | | |
|-----------------------|--------------------|-----------------|------------|
| | 300 kHz to 10 MHz | 10 MHz to 3 GHz | 3 to 9 GHz |
| Directivity | 45 | 52 | 45 |
| Source match | 36 | 44 | 36 |
| Load match | 36 | 45 | 38 |
| Reflection tracking | ± 0.10 | ± 0.04 | ± 0.07 |
| Transmission tracking | ± 0.153 | ± 0.052 | ± 0.17 |

Transmission uncertainty (specification)¹



Reflection uncertainty (specification)¹



1. Applies to the units with Serial Number Prefix MY542/SG542 and above

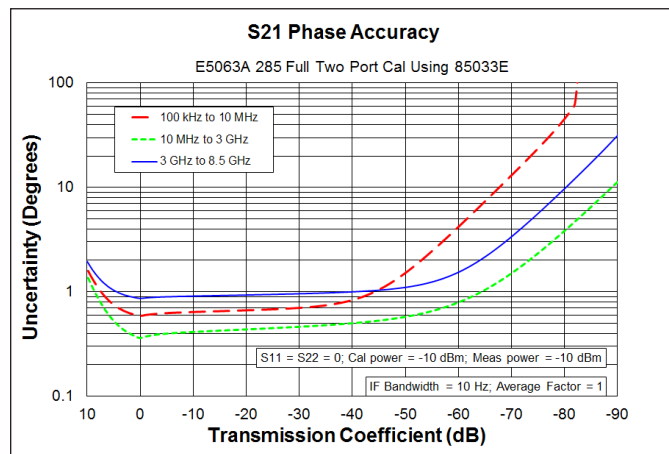
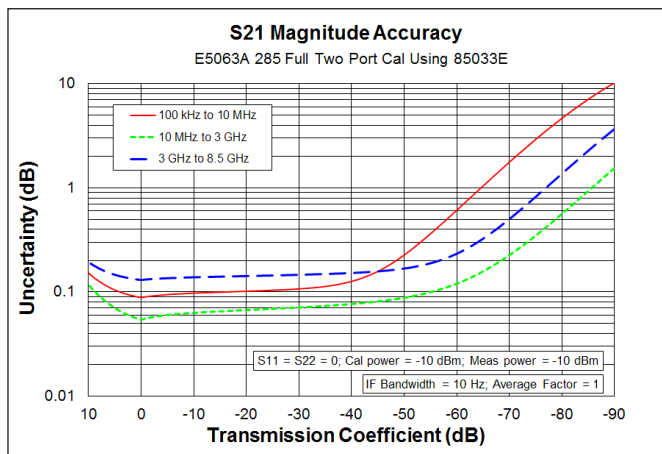
Corrected system performance with 3.5 mm device connector type, 85033E calibration kit

Vector network analyzer : E5063A
 Calibration kit : 85033E (3.5 mm, 50 Ω)
 Calibration : Full 2-port

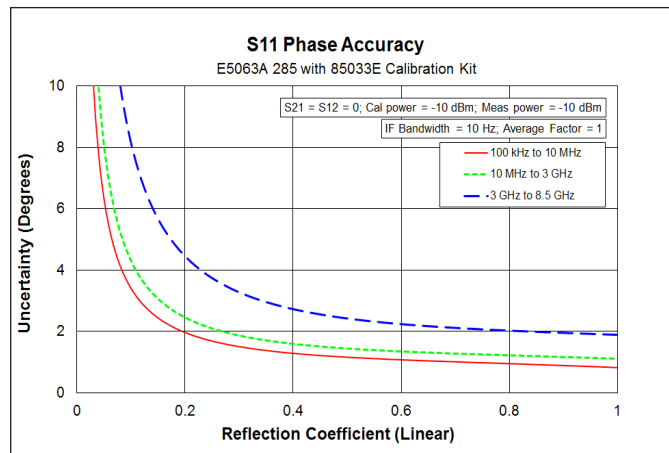
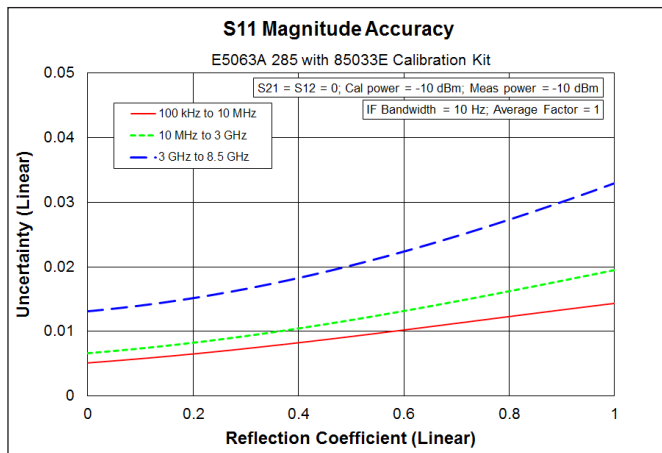
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration performed

| Description | Specification (dB) | | |
|-----------------------|--------------------------------|-----------------|------------|
| | 100 kHz to 10 MHz ¹ | 10 MHz to 3 GHz | 3 to 9 GHz |
| Directivity | 46 | 44 | 38 |
| Source match | 43 | 40 | 36 |
| Load match | 45 | 44 | 38 |
| Reflection tracking | ± 0.006 | ± 0.007 | ± 0.010 |
| Transmission tracking | ± 0.077 | ± 0.040 | ± 0.112 |

Transmission uncertainty (specification)²



Reflection uncertainty (specification)²



1. The performance from 50 kHz to 100 kHz is the same with one from 100 kHz to 10 MHz as typical
2. Applies to the units with Serial Number Prefix MY542/SG542 and above

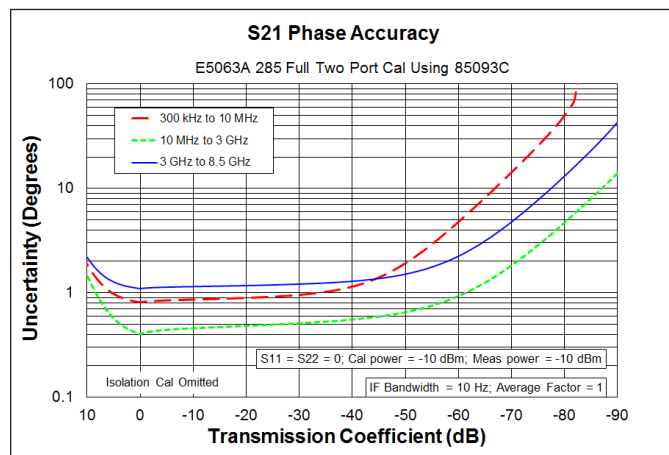
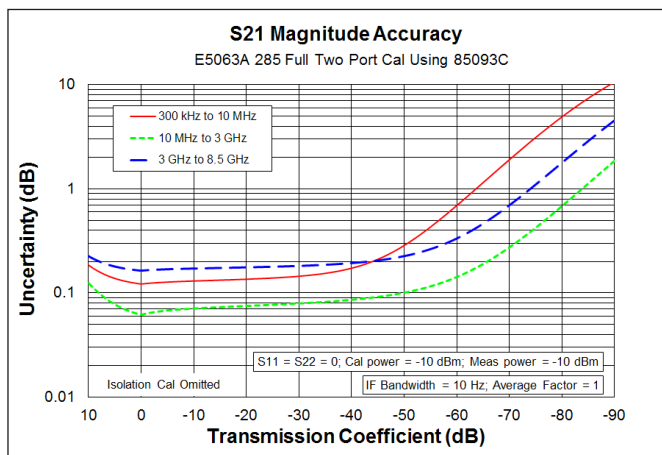
Corrected system performance with 3.5 mm device connector type, 85093C electronic calibration (ECal) module

Vector network analyzer : E5063A
 Calibration kit : 85093C (3.5 mm, 50 Ω) Electronic calibration (ECal) module
 Calibration : Full 2-port

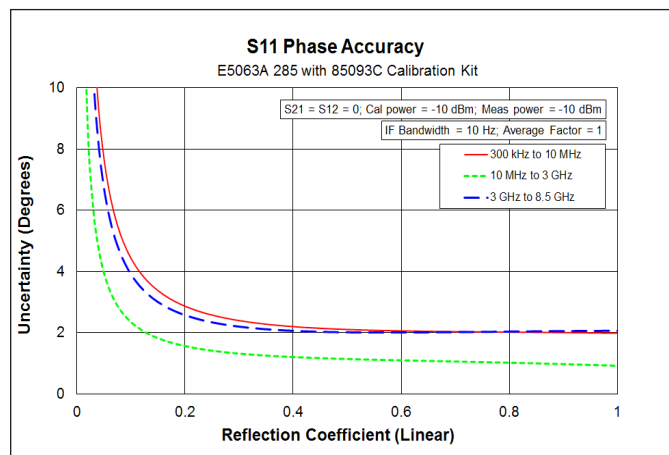
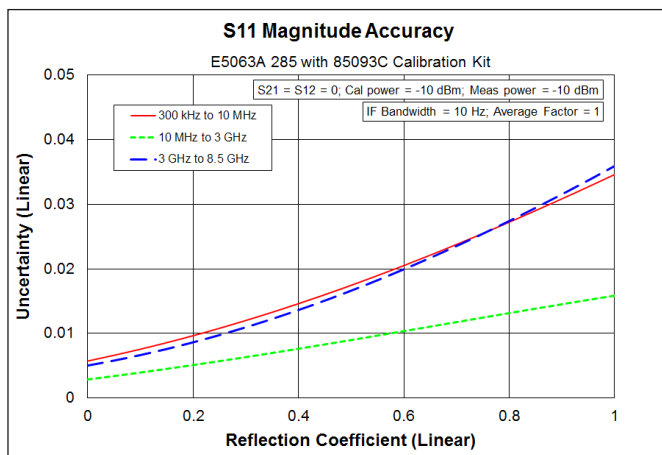
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (\pm 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration is not performed

| Description | Specification (dB) | | |
|-----------------------|--------------------|-----------------|-------------|
| | 300 kHz to 10 MHz | 10 MHz to 3 GHz | 3 to 9 GHz |
| Directivity | 45 | 52 | 47 |
| Source match | 36 | 44 | 34 |
| Load match | 36 | 45 | 39 |
| Reflection tracking | \pm 0.100 | \pm 0.040 | \pm 0.070 |
| Transmission tracking | \pm 0.156 | \pm 0.047 | \pm 0.155 |

Transmission uncertainty (specification)¹



Reflection uncertainty (specification)¹



1. Applies to the units with Serial Number Prefix MY542/SG542 and above

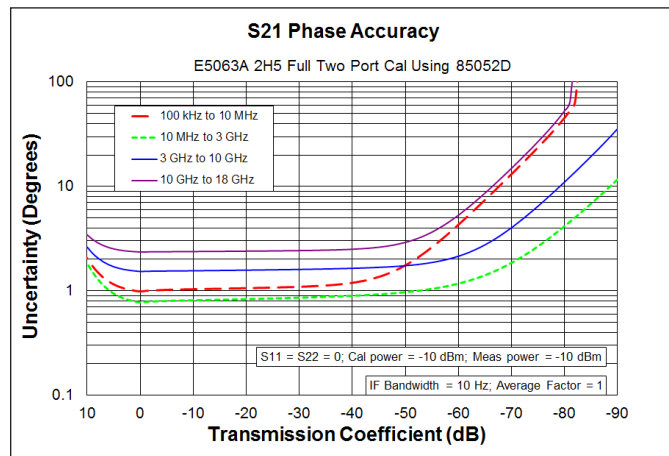
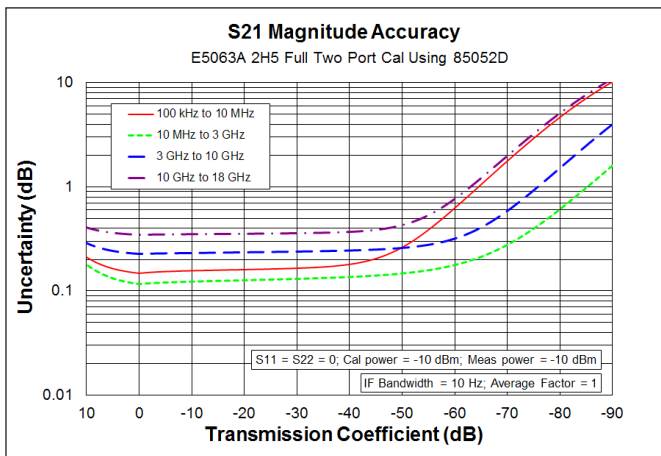
Corrected system performance with 3.5 mm device connector type, 85052D calibration kit

Vector network analyzer : E5063A
 Calibration kit : 85052D (3.5 mm, 50 Ω)
 Calibration : Full 2-port

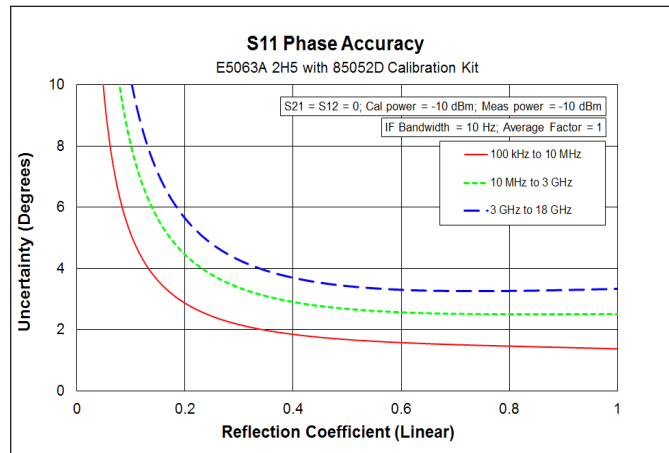
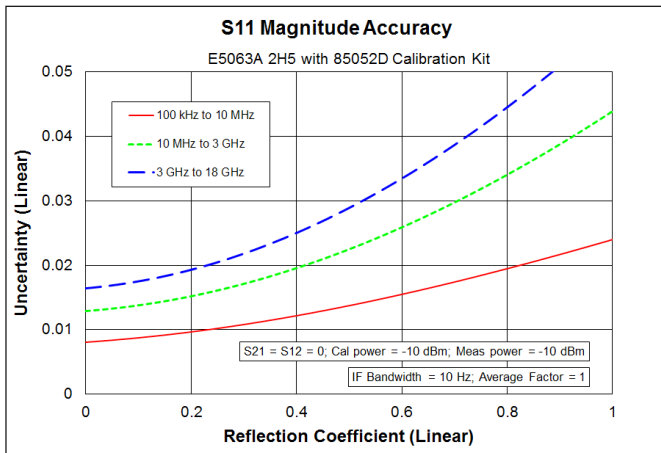
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration performed

| Description | Specification (dB) | | | |
|-----------------------|--------------------------------|-----------------|-------------|--------------|
| | 100 kHz to 10 MHz ¹ | 10 MHz to 3 GHz | 3 to 10 GHz | 10 to 18 GHz |
| Directivity | 42 | 38 | 36 | 36 |
| Source match | 37 | 31 | 28 | 28 |
| Load match | 42 | 38 | 36 | 36 |
| Reflection tracking | ± 0.003 | ± 0.004 | ± 0.008 | ± 0.008 |
| Transmission tracking | ± 0.136 | ± 0.100 | ± 0.208 | ± 0.328 |

Transmission uncertainty (specification)²



Reflection uncertainty (specification)²



1. The performance from 50 kHz to 100 kHz is the same with one from 100 kHz to 10 MHz as typical
2. Applies to the units with Serial Number Prefix MY542/SG542 and above

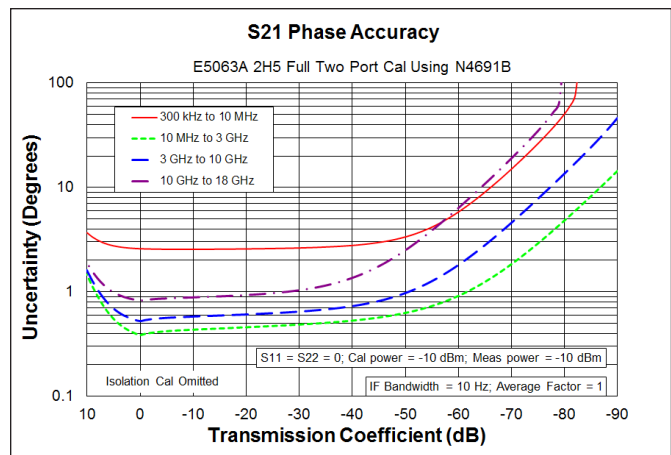
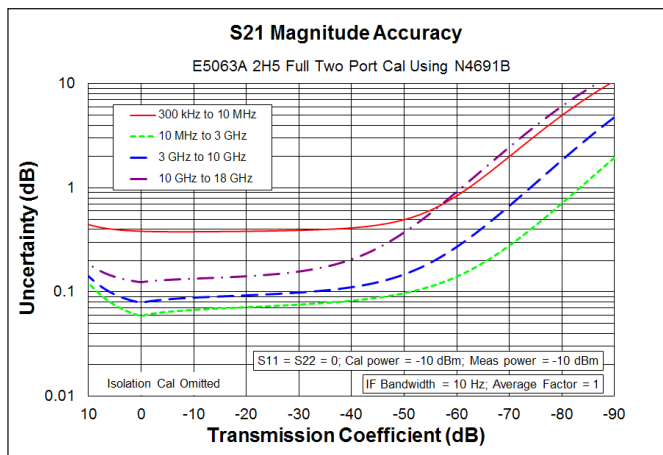
Corrected system performance with 3.5 mm device connector type, N4691B electronic calibration (ECal) module

Vector network analyzer : E5063A
 Calibration kit : N4691B (3.5 mm, 50 Ω) Electronic calibration (ECal) module
 Calibration : Full 2-port

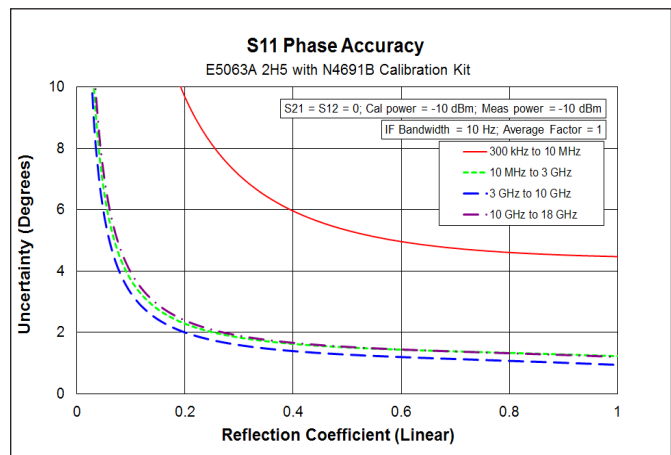
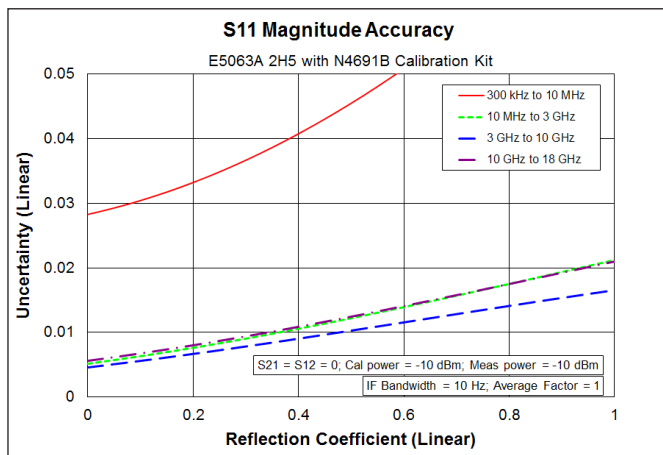
IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature, isolation calibration is not performed

| Description | Specification (dB) | | | |
|-----------------------|--------------------|-----------------|-------------|--------------|
| | 300 kHz to 10 MHz | 10 MHz to 3 GHz | 3 to 10 GHz | 10 to 18 GHz |
| Directivity | 31 | 46 | 48 | 46 |
| Source match | 29 | 41 | 45 | 42 |
| Load match | 27 | 42 | 42 | 39 |
| Reflection tracking | ± 0.110 | ± 0.050 | ± 0.030 | ± 0.040 |
| Transmission tracking | ± 0.358 | ± 0.046 | ± 0.062 | ± 0.107 |

Transmission uncertainty (specification)¹



Reflection uncertainty (specification)¹



1. Applies to the units with Serial Number Prefix MY542/SG542 and above

Uncorrected System Performance

User correction: OFF

System error correction: ON

| Description | Specification (dB) | | | | | | | |
|--------------------------|-----------------------|---------------------|-----------------|---------------------|---------------|----------------|-----------------|-----------------|
| | 100 kHz to 300 kHz | 300 kHz to 1 MHz | 1 to 100 MHz | 100 MHz to 3 GHz | 3 to 6 GHz | 6 to 10 GHz | 10 to 13 GHz | 13 to 18 GHz |
| Directivity | 10 dB | 10 dB | 25 dB | 25 dB | 20 dB | 15dB | 10 dB | 10 dB |
| Source match | 20 dB | 20 dB | 25 dB | 25 dB | 20 dB | 15dB | 15 dB | 15 dB |
| Load match | 7 dB (typ.) | 11 dB (typ.) | 14 dB | 11 dB | 10 dB | 7dB | 8 dB (typ.) | 6 dB (typ.) |
| Reflection tracking | ± 3.0 dB | ± 3.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB |
| Transmission tracking | ± 3.0 dB | ± 3.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB | ± 1.0 dB |

Test Port Output (Source)

Test port output frequency

| Description | Specification | Typical |
|------------------|---|---|
| Frequency range | | Frequency can be set from 50 kHz. The performance data from 50 to 100 kHz is typical. |
| Option 205 | 100 kHz to 500 MHz | |
| Option 215 | 100 kHz to 1.5 GHz | |
| Option 235 | 100 kHz to 3 GHz | |
| Option 245 | 100 kHz to 4.5 GHz | |
| Option 265 | 100 kHz to 6.5 GHz | |
| Option 285 | 100 kHz to 8.5 GHz | |
| Option 2D5 | 100 kHz to 14 GHz | |
| Option 2H5 | 100 kHz to 18 GHz | |
| Resolution | 1 Hz (100 kHz to 6.5 GHz) 2 Hz (6.5 to 13 GHz) 11 Hz (13 to 18 GHz) | |
| Source stability | | ± 7 ppm (5 to 40 °C) |
| CW accuracy | ± 7 ppm | |

Test port output power

| Description | Specification | Typical |
|-----------------------------------|---------------|---------------|
| Nominal power (preset power) | -5 dBm | |
| Range | | -20 to -5 dBm |
| 50 kHz to 100 kHz | | |
| 100 kHz to 300 kHz | -20 to -5 dBm | |
| 300 kHz to 8.5 GHz | -20 to 0 dBm | |
| 8.5 to 18 GHz | -15 to -5 dBm | |
| Resolution | 0.05 dB | |
| Level accuracy | | |
| At 50 MHz, -5 dBm, absolute | | ± 0.9 dB |
| (level flatness) ¹ | | |
| 50 kHz to 300 kHz | | ± 3.7 dB |
| 300 kHz to 1 MHz | | ± 2.0 dB |
| 1 MHz to 4.34 GHz | | ± 1.0 dB |
| 4.34 to 8.5 GHz | | ± 1.6 dB |
| 8.5 to 12 GHz | | ± 3.6 dB |
| 12 to 18 GHz | | ± 5.8 dB |
| Level linearity ² | | |
| -10 to -5 dBm, 50 kHz to 300 kHz | | ± 1.6 dB |
| -10 to 0 dBm, 300 kHz to 8.5 GHz | | ± 1.6 dB |
| -10 to -5 dBm, 8.5 to 18 GHz | | ± 1.8 dB |
| -20 to -10 dBm, 50 kHz to 8.5 GHz | | ± 2.7 dB |
| -15 to -10 dBm, 8.5 to 18 GHz | | ± 2.9 dB |

1. Level accuracy of other frequencies is taken at -5 dBm, relative to 50 MHz reference unless otherwise stated. Level accuracy includes averaged total (non-) harmonics power. Its transient factor is not included.
2. Level linearity given is relative to -5 dBm unless otherwise stated. Level linearity includes averaged total (non-) harmonics power. The level accuracy needs to be taken into account for test port output power level. Its transient factor is not included.

Test Port Input

| Description | Specification | Typical |
|---|---------------|------------|
| Test port input level | | |
| Maximum input level | +6 dBm | |
| Crosstalk | | -88 dB |
| 50 kHz to 100 kHz | | |
| 100 kHz to 300 kHz | -88 dB | |
| 300 kHz to 8.5 MHz | -93 dB | |
| 8.5 MHz to 4.34 GHz | -115 dB | |
| 4.34 to 6 GHz | -105 dB | |
| 6 to 13 GHz | -100 dB | |
| 13 to 16 GHz | -90 dB | |
| 16 to 18 GHz | -85 dB | |
| Test Port Noise Floor | | |
| (IFBW=1 Hz) | | |
| 50 kHz to 100 kHz | | -103 dBm |
| 100 kHz to 8.5 MHz | -103 dBm | |
| 8.5 to 100 MHz | -126 dBm | |
| 100 MHz to 4.34 GHz | -127 dBm | |
| 4.34 to 8.5 GHz | -116 dBm | |
| 8.5 to 13 GHz | -115 dBm | |
| 13 to 16 GHz | -105 dBm | |
| 16 to 18 GHz | -102 dBm | |
| Compression level (at maximum test port input level = +6 dBm) | | |
| Magnitude | | |
| 50 kHz to 1 MHz | | ± 0.2 dB |
| 1 MHz to 4.34 GHz | | ± 0.2 dB |
| 4.34 to 13 GHz | | ± 0.2 dB |
| 13 to 18 GHz | | ± 0.2 dB |
| Phase | | |
| 50 kHz to 1 MHz | | ± 5 deg. |
| 1 MHz to 4.34 GHz | | ± 1.5 deg. |
| 4.34 to 13 GHz | | ± 6 deg. |
| 13 to 18 GHz | | ± 10 deg. |

Trace noise

| Description | Specification | Typical |
|--|---------------|---------------|
| (at maximum output power level of sweep range) | | |
| Magnitude | | |
| Transmission: | | |
| 50 kHz to 100 kHz, 3 kHz IFBW | | 8 mdB rms |
| 100 kHz to 300 kHz, 3 kHz IFBW | 8 mdB rms | 5 mdB rms |
| 300 kHz to 8.5 MHz, 3 kHz IFBW | 6 mdB rms | 3 mdB rms |
| 8.5 MHz to 4.34 GHz, 70 kHz IFBW | 5 mdB rms | 2 mdB rms |
| 4.34 to 8.5 GHz, 70 kHz IFBW | 10 mdB rms | 5 mdB rms |
| 8.5 to 13 GHz, 70 kHz IFBW | 15 mdB rms | 8 mdB rms |
| 13 to 16 GHz, 70 kHz IFBW | 25 mdB rms | 15 mdB rms |
| 16 to 18 GHz, 70 kHz IFBW | 30 mdB rms | 20 mdB rms |
| Reflection: | | |
| 50 kHz to 100 kHz, 3 kHz IFBW | | 16 mdB rms |
| 100 kHz to 300 kHz, 3 kHz IFBW | 16 mdB rms | 7 mdB rms |
| 300 kHz to 8.5 MHz, 3 kHz IFBW | 10 mdB rms | 4 mdB rms |
| 8.5 MHz to 4.34 GHz, 70 kHz IFBW | 9 mdB rms | 3 mdB rms |
| 4.34 to 8.5 GHz, 70 kHz IFBW | 20 mdB rms | 10 mdB rms |
| 8.5 to 13 GHz, 70 kHz IFBW | 30 mdB rms | 18 mdB rms |
| 13 to 16 GHz, 70 kHz IFBW | 35 mdB rms | 20 mdB rms |
| 16 to 18 GHz, 70 kHz IFBW | 45 mdB rms | 30 mdB rms |
| Phase | | |
| Transmission: | | |
| 50 kHz to 100 kHz, 3 kHz IFBW | | 0.05 deg rms |
| 100 kHz to 300 kHz, 3 kHz IFBW | 0.05 deg rms | 0.03 deg rms |
| 300 kHz to 8.5 MHz, 3 kHz IFBW | 0.04 deg rms | 0.02 deg rms |
| 8.5 MHz to 4.34 GHz, 70 kHz IFBW | 0.035 deg rms | 0.015 deg rms |
| 4.34 to 8.5 GHz, 70 kHz IFBW | 0.066 deg rms | 0.04 deg rms |
| 8.5 to 13 GHz, 70 kHz IFBW | 0.1 deg rms | 0.06 deg rms |
| 13 to 16 GHz, 70 kHz IFBW | 0.17 deg rms | 0.1 deg rms |
| 16 to 18 GHz, 70 kHz IFBW | 0.2 deg rms | 0.13 deg rms |
| Reflection: | | |
| 50 kHz to 100 kHz, 3 kHz IFBW | | 0.1 deg rms |
| 100 kHz to 300 kHz, 3 kHz IFBW | 0.1 deg rms | 0.05 deg rms |
| 300 kHz to 8.5 MHz, 3 kHz IFBW | 0.066 deg rms | 0.03 deg rms |
| 8.5 MHz to 4.34 GHz, 70 kHz IFBW | 0.06 deg rms | 0.02 deg rms |
| 4.34 to 8.5 GHz, 70 kHz IFBW | 0.13 deg rms | 0.07 deg rms |
| 8.5 to 13 GHz, 70 kHz IFBW | 0.2 deg rms | 0.12 deg rms |
| 13 to 16 GHz, 70 kHz IFBW | 0.23 deg rms | 0.14 deg rms |
| 16 to 18 GHz, 70 kHz IFBW | 0.3 deg rms | 0.2 deg rms |

Stability¹

| Description | Specification | Typical |
|--------------------|---------------|---------------|
| Magnitude | | |
| Transmission: | | |
| 100 kHz to 300 kHz | | ± 0.02 dB/°C |
| 300 kHz to 6 GHz | | ± 0.01 dB/°C |
| 6 to 12 GHz | | ± 0.025 dB/°C |
| 12 to 18 GHz | | ± 0.04 dB/°C |
| Reflection: | | |
| 100 kHz to 300 kHz | | ± 0.02 dB/°C |
| 300 kHz to 6 GHz | | ± 0.02 dB/°C |
| 6 to 12 GHz | | ± 0.035 dB/°C |
| 12 to 18 GHz | | ± 0.05 dB/°C |
| Phase | | |
| Transmission: | | |
| 100 kHz to 300 kHz | | ± 0.4 deg/°C |
| 300 kHz to 6 GHz | | ± 0.2 deg/°C |
| 6 to 12 GHz | | ± 0.5 deg/°C |
| 12 to 18 GHz | | ± 0.6 deg/°C |
| Reflection: | | |
| 100 kHz to 300 kHz | | ± 0.4 deg/°C |
| 300 kHz to 6 GHz | | ± 0.2 deg/°C |
| 6 to 12 GHz | | ± 0.5 deg/°C |
| 12 to 18 GHz | | ± 0.6 deg/°C |

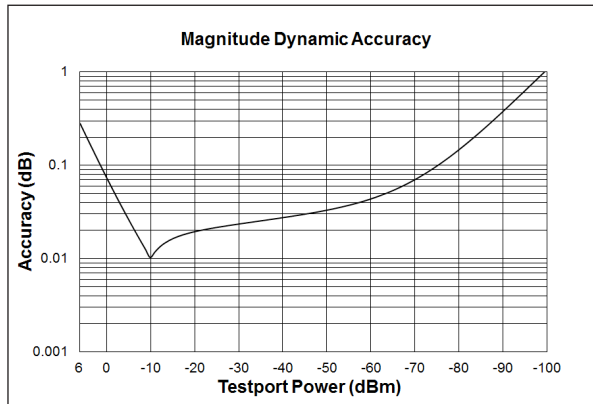
1. Stability is defined as a ratio measurement at the test port.

Dynamic accuracy^{1,2}

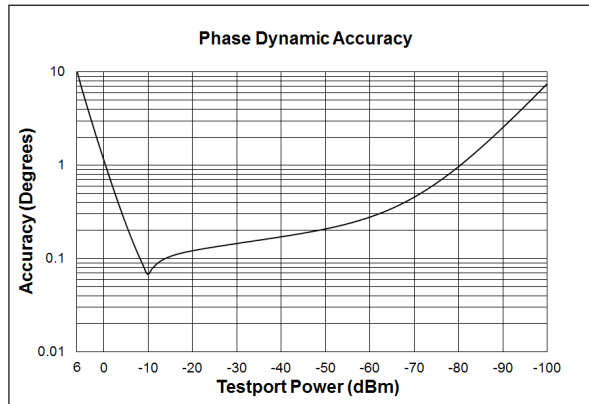
| Description | Specification | Typical |
|-------------|-----------------|---------------|
| Magnitude | | |
| 6 dBm | ± 0.281 dB | |
| -30 dBm | ± 0.023 dB | |
| -100 dBm | ± 1.070 | |
| -110 dBm | | ± 3.00 dB |
| Phase | | |
| 6 dBm | ± 10.20 deg | |
| -30 dBm | ± 0.15 deg | |
| -100 dBm | ± 7.53 deg | |

- Dynamic accuracy is verified with the following measurements:
 - Compression over frequency
 - IF linearity at two frequencies (1 MHz and 2 GHz) using a reference level of -10 dBm for an input power range of 0 to -60 dBm. For value below -60 dBm, refer to “VNA Receiver Dynamic Accuracy Specifications and Uncertainties N5247-90003” <https://literature.cdn.keysight.com/litweb/pdf/N5247-90003.pdf>
- Applies to the units with Serial Number Prefix MY542/SG542 and above

Magnitude



Phase



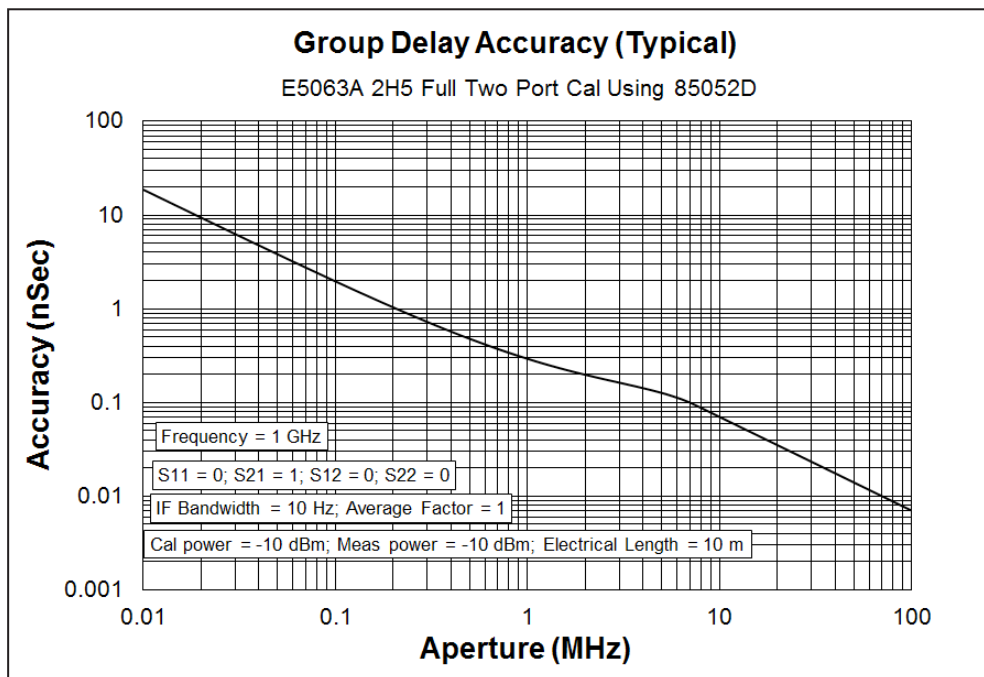
Group delay¹

| Description | Specification | Typical |
|-----------------------|---|---|
| Aperture (selectable) | (frequency span)/(number of points - 1) | |
| Maximum aperture | 25% of frequency span | |
| Minimum delay | | Limited to measuring no more than 180° of phase change within the minimum aperture. |
| Accuracy | | See graph below (typical) |

1. Group delay is computed by measuring the phase change within a specified step (determined by the frequency span and the number of points per sweep).

The following graph shows group delay accuracy with 3.5 mm connectors, full 2-port calibration and a 10 Hz IF bandwidth.

- Calibration kit (85052D).
- Insertion loss is assumed to be < 2 dB.



In general, the following formula can be used to determine the accuracy, in seconds, of a specific group delay measurement:
 $\pm \text{phase accuracy (degrees)} / [360 \times \text{aperture (Hz)}]$

General Information

| Description | General characteristics |
|-----------------------------|--|
| System bandwidth Range | 10, 15, 20, 30, 40, 50, 70, 100, 150, 200, 300, 400, 500, 700, 1 kHz, 1.5 kHz, 2 kHz, 3 kHz, 4 kHz, 5 kHz, 7 kHz, 10 kHz, 15 kHz, 20 kHz, 30 kHz, 40 kHz, 50 kHz, 70 kHz, 100 kHz, 150 kHz, 200 kHz, 300 kHz |
| Number of points per traces | 2 to 10,001 |

Front panel

| Description | Typical | General characteristics |
|-------------------------------|---------|--|
| Test ports Damage Level | | Type-N, female, 50 Ω (nominal) +26 dBm or \pm 35 VDC (warranted) |
| Display Type Resolution | | 10.4 inch multi touch screen LCD XGA (1024 x 768) ¹ |
| USB host port | | Universal serial bus jack, type A configuration, female; provides connection to mouse, keyboard, printer, ECal module, USB coaxial switch, or USB/GPIB interface |

1. Valid pixels are 99.99 % and more. Below 0.01 % of fixed points of black, blue, green or red are not regarded as failure.








Rear panel

| Description | Typical | General characteristics |
|---|---|---|
| External trigger input connector Type Input level Pulse width Polarity | | BNC, female Low threshold voltage: 0.5 V High threshold voltage: 2.1 V Input level range: 0 to + 5 V \geq 2 μ sec Positive or negative |
| External trigger output connector Type Maximum output current Output level Pulse width Polarity | | BNC, female 50 mA Low level voltage: 0 V High level voltage: 5 V 1 μ sec to 1 sec (adjustable) Positive or negative |
| External reference signal input connector Type Input frequency Input level Input impedance | 10 MHz \pm 10 ppm 0 dBm to \pm 3 dB | BNC, female 50 Ω |
| Internal reference signal output connector Type Output frequency Signal type Output level Output impedance | 10 MHz \pm 7 ppm Sinewave 0 dBm \pm 3 dB into 50 Ω | BNC, female 50 Ω |

| Description | Typical | General characteristics |
|---|---------|--|
| Video output | | DisplayPort and 15 pin mini D-Sub, female; drives VGA compatible monitors |
| GPIB ¹ | | 24-pin D-Sub (Type D-24), female; compatible with IEEE-488 |
| USB host port | | Universal serial bus jack, type A configuration, female; provides connection to mouse, keyboard, printer, ECal module, USB coaxial switch, or USB/GPIB interface |
| USB (USBTMC ²) interface port | | Universal serial bus jack, type B configuration (4 contacts inline), female; provides connection to an external PC; compatible with USBTMC-USB488 and USB 2.0.LA |
| LAN | | 10/100/1000 BaseT Ethernet, 8-pin configuration; auto selects among the three data rates |
| Handler I/O port ³ | | 36-pin Centronics, female; provides connection to handler system |
| Line Power ⁴ | | |
| Frequency | | 47 to 63 Hz |
| Voltage | | 90-264 VAC ($V_{peak} > 120\text{ V}$) |
| VA max | | 300 VA max |
| Power consumption ⁵ | 120 W | |

1. The GPIB card interface is optional. To include this interface, order E5063A-721.
2. USB Test and Measurement Class (TMC) interface that communicates over USB, complying with the IEEE 488.1 and IEEE 488.2 standards.
3. The handler I/O interface is optional. To include this interface, order E5063A-731.
4. A third-wire ground is required.
5. At preset condition. No application running other than the E5063A on windows.

EMC, safety, environment and compliance

| Description | General characteristics |
|--|--|
| EMC | |
|  ISM 1-A | European Council Directive 2004/108/EC IEC 61326-1:2012 EN 61326-1:2013 CISPR 11:2009 +A1:2010 EN 55011: 2009 +A1:2010 Group 1, Class A IEC 61000-4-2:2008 EN 61000-4-2:2009 4 kV CD / 8 kV AD IEC 61000-4-3:2006 +A1:2007 +A2:2010 EN 61000-4-3:2006 +A1:2008 +A2:2010 3 V/m, 80-1000 MHz, 1.4 - 2.0 GHz /1V/m, 2.0 - 2.7 GHz, 80% AM IEC 61000-4-4:2004 +A1:2010 EN 61000-4-4:2004 +A1:2010 1 kV power lines / 0.5 kV signal lines IEC 61000-4-5:2005 EN 61000-4-5:2006 0.5 kV line-line / 1 kV line-ground IEC 61000-4-6:2008 EN 61000-4-6:2009 3 V, 0.15-80 MHz, 80% AM IEC 61000-4-8:2009 EN 61000-4-8:2010 30A/m, 50/60Hz IEC 61000-4-11:2004 EN 61000-4-11:2004 0.5-300 cycle, 0% / 70% |
| ICES/NMB-001 | ICES-001:2006 Group 1, Class A |
|  | AS/NZS CISPR11:2004 Group 1, Class A |
|  | KN11, KN61000-6-1 and KN61000-6-2 Group 1, Class A |
| Safety | |
|  ISM 1-A | European Council Directive 2006/95/EC IEC 61010-1:2001/EN 61010-1:2001 Measurement Category I Pollution Degree 2 Indoor Use |
|  | CAN/CSA C22.2 No. 61010-1-12 Measurement Category I Pollution Degree 2 Indoor Use |
| Environment | |
|  | This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a "Monitoring and Control instrumentation" product. Do not dispose in domestic household waste. To return unwanted products, contact your local Keysight office, or see http://www.keysight.com/environment/product/ for more information. |
| Compliance | |
|  | Class C |

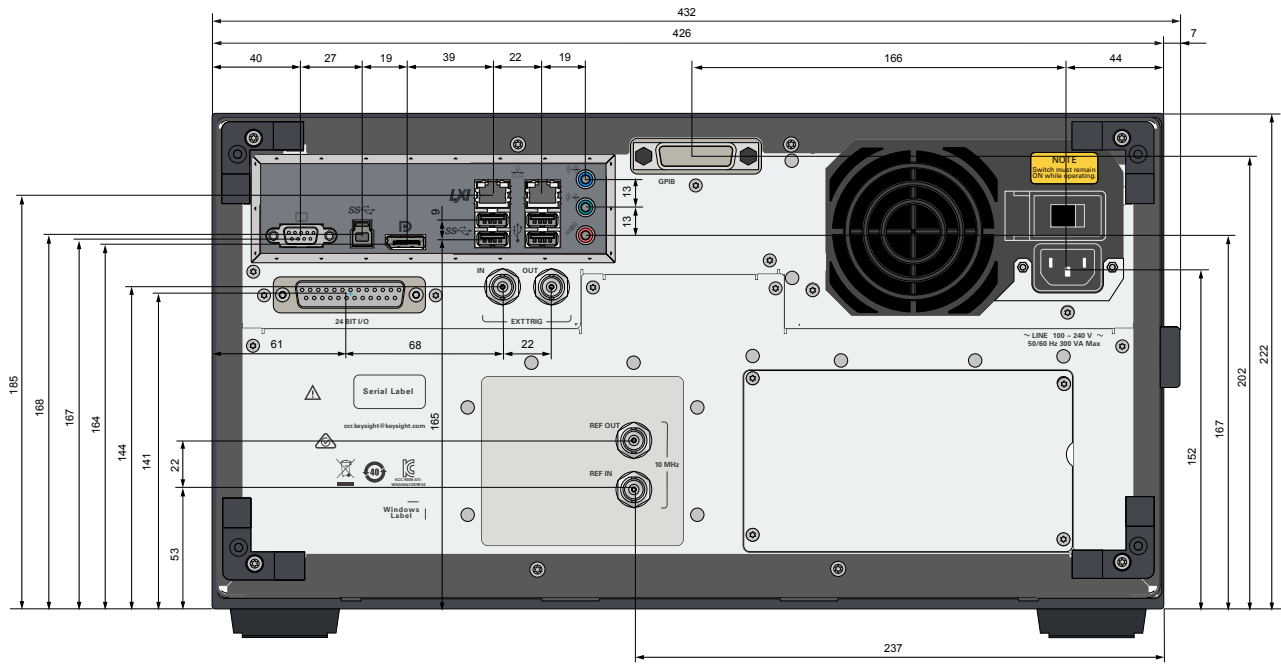
Analyzer environmental specifications and dimensions

| Description | General characteristics |
|-----------------------------------|---|
| Operating environment | |
| Temperature | +5 °C to +40 °C |
| Error-corrected temperature range | 23 °C (± 5 °C) with < 1 °C deviation from calibration temperature |
| Humidity | 20% to 80% at wet bulb temperature < +29 °C (non-condensation) |
| Altitude | 0 to 2,000 m (0 to 6561 feet) |
| Vibration | 0.21 G maximum, 5 Hz to 500 Hz |
| Non-operating environment | |
| Temperature | -10 °C to +60 °C |
| Humidity | 20% to 90% at wet bulb temperature < +40 °C (non-condensation) |
| Altitude | 0 to 4,572 m (0 to 15,000 feet) |
| Vibration | 0.5 G maximum, 5 to 500 Hz |
| Dimensions | See below |
| Weight (net) | 11.8 kg |

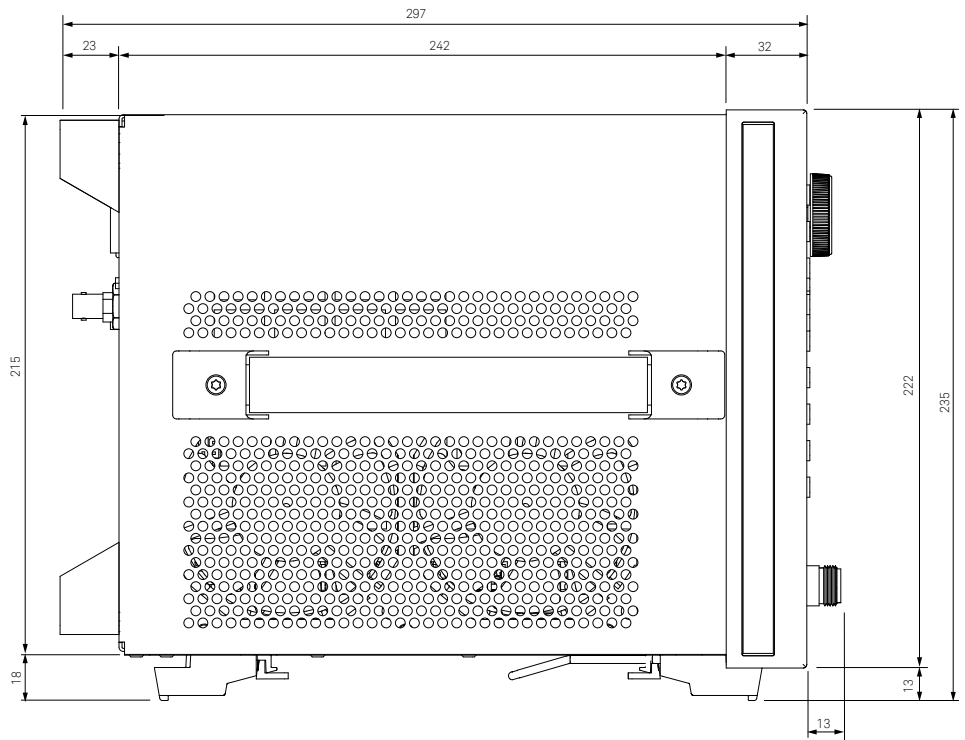
Dimensions (front view)



Dimensions (rear view)



Dimensions (side view)



(in millimeters)

Measurement Throughput Summary

Measurement throughput data is typical performance data. Common condition for the measurement throughput data:

- Analyzer display turned off with: DISP : ENAB OFF
- Number of traces = 1
- firmware version: A.04.0x

Cycle time for measurement completion

| Number of Points | 300 kHz IF bandwidth | | | | 30 kHz IF bandwidth | | | | 1 kHz IF bandwidth | | | |
|-----------------------------|----------------------|-----|-----|------|---------------------|-----|-----|------|--------------------|-----|------|------|
| | 51 | 201 | 401 | 1601 | 51 | 201 | 401 | 1601 | 51 | 201 | 401 | 1601 |
| Start 1 GHz, stop 1.2 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 4 | 9 | 14 | 43 | 6 | 15 | 26 | 89 | 53 | 201 | 398 | 1575 |
| Response cal, S21 | 4 | 10 | 16 | 50 | 7 | 21 | 39 | 142 | 102 | 394 | 784 | 3113 |
| 2-port cal, S21 | 8 | 19 | 32 | 99 | 14 | 42 | 78 | 283 | 203 | 788 | 1566 | 6226 |
| Start 100 kHz, stop 4.5 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 9 | 17 | 27 | 72 | 10 | 23 | 38 | 118 | 57 | 210 | 410 | 1604 |
| Response cal, S21 | 9 | 18 | 28 | 79 | 12 | 30 | 51 | 171 | 106 | 403 | 796 | 3142 |
| 2-port cal, S21 | 17 | 35 | 546 | 156 | 23 | 59 | 102 | 341 | 212 | 805 | 1591 | 6284 |
| Start 100 kHz, stop 8.5 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 11 | 20 | 29 | 74 | 13 | 26 | 41 | 120 | 60 | 213 | 413 | 1606 |
| Response cal, S21 | 12 | 21 | 31 | 81 | 15 | 33 | 54 | 173 | 109 | 406 | 798 | 3145 |
| 2-port cal, S21 | 23 | 42 | 61 | 161 | 29 | 65 | 107 | 346 | 218 | 811 | 1596 | 6289 |
| Start 11 GHz, stop 12 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 4 | 9 | 15 | 47 | 6 | 15 | 27 | 93 | 53 | 202 | 399 | 1579 |
| Response cal, S21 | 5 | 10 | 17 | 53 | 8 | 22 | 40 | 146 | 102 | 395 | 785 | 3117 |
| 2-port cal, S21 | 9 | 20 | 34 | 106 | 14 | 43 | 80 | 291 | 204 | 789 | 1568 | 6233 |
| Start 8 GHz, stop 18 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 10 | 17 | 24 | 64 | 12 | 23 | 36 | 110 | 59 | 209 | 408 | 1596 |
| Response cal, S21 | 11 | 18 | 26 | 71 | 14 | 29 | 49 | 163 | 108 | 402 | 793 | 3134 |
| 2-port cal, S21 | 21 | 35 | 51 | 141 | 26 | 58 | 97 | 325 | 216 | 804 | 1586 | 6268 |
| Start 100 kHz, stop 18 GHz | | | | | | | | | | | | |
| 1-port cal, S11 | 15 | 25 | 34 | 80 | 16 | 30 | 45 | 127 | 63 | 217 | 417 | 1612 |
| Response cal, S21 | 15 | 26 | 356 | 87 | 18 | 37 | 59 | 179 | 113 | 410 | 803 | 3151 |
| 2-port cal, S21 | 29 | 50 | 70 | 174 | 35 | 74 | 117 | 358 | 224 | 820 | 1605 | 6301 |

Unit: ms

Data transfer time^{1, 2}

| | Number of Points | | | |
|-----------------------------------|------------------|-----|-----|------|
| | 51 | 201 | 401 | 1601 |
| SCPI over GPIB | | | | |
| 64-bit floating point | 5 | 16 | 30 | 114 |
| 32-bit floating point | 3 | 9 | 16 | 58 |
| ASCII | 13 | 48 | 94 | 372 |
| SCPI over 100 Mbps LAN (Socket) | | | | |
| REAL 64 | 1 | 1 | 1 | 2 |
| REAL 32 | 1 | 1 | 1 | 2 |
| ASCII | 7 | 18 | 35 | 132 |
| SCPI over 100 Mbps LAN (SICL-LAN) | | | | |
| REAL 64 | 4 | 5 | 5 | 5 |
| REAL 32 | 5 | 5 | 5 | 5 |
| ASCII | 4 | 5 | 11 | 31 |
| SCPI over 100 Mbps LAN (SICL-USB) | | | | |
| REAL 64 | 2 | 2 | 2 | 3 |
| REAL 32 | 2 | 2 | 2 | 3 |
| ASCII | 2 | 6 | 10 | 39 |
| SCPI over GPIB/USB (82357B) | | | | |
| REAL 64 | 8 | 18 | 31 | 107 |
| REAL 32 | 7 | 12 | 18 | 57 |
| ASCII | 73 | 281 | 561 | 2243 |

1. Transferred complex S11 data, using :CALC:DATA:FDAT?.

2. Data transfer time varies depending on the type of PC and control software.

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