



**3643K/43NA/43N/43P/43QA/43Q/43SA/43R/43S/43TA/49B**

## **Millimeter-Wave VNA Extender**

**(40GHz to 60GHz/50GHz to 75GHz/60GHz to 90GHz/75GHz to 110GHz/90GHz to 140GHz/110GHz to 170GHz/140GHz to 220GHz/170GHz to 260GHz/220GHz to 325GHz/260GHz to 400GHz/325GHz to 500GHz)**



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## Product Overview

The 3643K/43NA/43N/43P/43QA/43Q/43SA/43R/43S/43TA/49B Millimeter-Wave VNA Extender has reached the international level in measuring speed, dynamic range and measuring stability. In terms of hardware, this module adopts new design concepts and technical solutions, so that the key technical performance indicators of the whole unit are significantly improved; in terms of software, its spread spectrum system is based on the platform environment of Windows operating system, so that the interconnectivity and usability of the whole unit has been greatly improved.

The 3643K/43NA/43N/43P/43QA/43Q/43SA/43R/43S/43TA/49B Millimeter-Wave VNA Extender can be used to compose a millimeter wave vector network analyzer system with a 3640A millimeter wave spread spectrum controller and a vector network analyzer, which can realize flexible configuration of 5mm, 3mm, 2mm, 1mm frequency band and an even higher frequency band, and the highest frequency can cover 500GHz. It has the features of simple system configuration, friendly user interface and high test precision, and realizes the measurement of all S parameters of millimeter wave measured network. The system is widely used in R&D and production testing for millimeter wave components, MMIC, antenna and RCS and materials.

## Main Features

- Frequency coverage: 40GHz~500GHz
- Windows 7 operating system, Chinese menu, as well as English menu options
- Various calibration methods such as frequency response, single port, response isolation, dual port, TRL and so on
- Compatible with different manufacturers of vector network analyzer
- Realizing frequency extender measurement of two-port vector network analyzer by 3640A
- Unified miniaturization and inclined panel design for different frequency bands
- Universal platform, easy to operate, can improve test efficiency
- Suitable for PNA-X 524X series and ZNA xx series products

## Typical Applications

It is mainly used for S-parameter testing of passive components such as millimeter-wave directional couplers, filters, and power dividers, and active components such as millimeter-wave mixers and amplifiers. The millimeter wave vector network analyzer can simultaneously obtain the amplitude response, phase response and group delay characteristics of the millimeter wave network under test, and can meet the requirements of wide frequency band, large dynamic range and fast real-time testing at the same time. It is essential for developing millimeter wave phased array radar, communication, electronic reconnaissance and other equipment test.



## Technical Specifications

| Model<br>Technical Indicators                                      | 3643K                 | 3643NA                | 3643N                      | 3643P                 | 3643QA                |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Frequency range  | 40GHz~<br>60GHz       | 50GHz~<br>75GHz       | 60GHz~<br>90GHz            | 75GHz~<br>110GHz      | 90GHz~<br>140GHz      |
| Port output power  | +6dBm<br>+8dBm(typ.)  | +5dBm<br>+7dBm(typ.)  | +5dBm<br>+10dBm(typ.<br>.) | 5dBm<br>+7dBm(typ.)   | +3dBm<br>+6dBm(typ.)  |
| System dynamic range<br>(intermediate frequency<br>bandwidth 10Hz) | 100dB<br>110(typ.)    | 100dB<br>110(typ.)    | 100dB<br>110(typ.)         | 100dB<br>110(typ.)    | 100dB<br>105(typ.)    |
| Reflection tracking (dB)   | 0.12<br>0.05(typ.)    | 0.12<br>0.05(typ.)    | ≤0.12<br>0.05(typ.)        | ≤0.12<br>0.05(typ.)   | ≤0.15<br>0.08(typ.)   |
| Transmission tracking<br>(dB)                                      | 0.12<br>0.05(typ.)    | 0.12<br>0.05(typ.)    | ≤0.12<br>0.05(typ.)        | ≤0.12<br>0.05(typ.)   | ≤0.15<br>0.08(typ.)   |
| Effective directivity (dB)   | ≤-35dB<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.)      | ≤-35dB<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.) |
| Payload matching (dB)  | ≤-35Db<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.)      | ≤-35dB<br>-40dB(typ.) | ≤-35dB<br>-40dB(typ.) |
| Port connector form  | WR19                  | WR15                  | WR12                       | WR10                  | WR8.0                 |
| Working voltage  | 12VDC, ≤50W           |                       |                            |                       |                       |
| Outline dimension width<br>× height × depth (mm)                   | 120×90×240            |                       |                            |                       |                       |

## Technical Specifications (continued)

| Model<br>Technical<br>Indicators                             | 3643Q                 | 3643SA                | 3643R                 | 3643S                  | 3643TA                 | 3649B                  |
|--|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|
| Frequency range  | 110GHz~<br>170GHz     | 140GHz~<br>220GHz     | 170GHz~<br>260GHz     | 220GHz~<br>325GHz      | 260GHz~<br>400GHz      | 325GHz~<br>500GHz      |
| Port output power  | -1dBm<br>+3dBm(typ.)  | -9dBm<br>-5dBm(typ.)  | -10dBm<br>-5dBm(typ.) | -13dBm<br>-10dBm(typ.) | -20dBm<br>-10dBm(typ.) | -23dBm<br>-20dBm(typ.) |
| System dynamic range (intermediate frequency bandwidth 10Hz) | 100dB<br>105(typ.)    | 100dB<br>105(typ.)    | 100dB<br>105(typ.)    | 95dB<br>100(typ.)      | 80dB<br>95(typ.)       | 80dB<br>90(typ.)       |
| Reflection tracking (dB)                                     | 0.25<br>0.1(typ.)     | 0.25<br>0.15(typ.)    | 0.2<br>0.1(typ.)      | 0.2<br>0.1(typ.)       | 0.3<br>0.15(typ.)      | 0.3<br>0.2(typ.)       |
| Transmission tracking (dB)                                   | 0.15<br>0.1(typ.)     | 0.25<br>0.15(typ.)    | 0.2<br>0.1(typ.)      | 0.2<br>0.1(typ.)       | 0.3<br>0.15(typ.)      | 0.3<br>0.2(typ.)       |
| Effective directivity (dB)                                   | ≤-34dB<br>-40dB(typ.) | ≤-30dB<br>-35dB(typ.) | ≤-25dB<br>-30dB(typ.) | ≤-25dB<br>-30dB(typ.)  | ≤-20dB<br>-30dB(typ.)  | ≤-20dB<br>-25dB(typ.)  |
| Payload matching (dB)  | ≤-35dB<br>-40dB(typ.) | ≤-30dB<br>-35dB(typ.) | ≤-25dB<br>-30dB(typ.) | ≤-25dB<br>-30dB(typ.)  | ≤-20dB<br>-30dB(typ.)  | ≤-20dB<br>-25dB(typ.)  |
| Port connector   | WR6.5                 | WR5.1                 | WR4.3                 | WR3.4                  | WR2.8                  | WR2.2                  |
| Working voltage  | 12VDC, ≤50W           |                       |                       |                        |                        |                        |
| Dimension width × height × depth (mm)                        | 120×90×240            |                       |                       |                        |                        |                        |

3640A millimeter wave spread spectrum controller, compatible with 3672X series and PNA-X series vector network analyzers.



## Technical Specifications

| Technical Indicators<br>Model | Frequency range | Output power | Control interface     | Power output | Power supply  | Outline dimension<br>width × height × depth (mm) |
|-------------------------------|-----------------|--------------|-----------------------|--------------|---|--|
| 3640A                         | 8GHz~20GHz      | 10±1dBm      | Test device interface | 12VDC@2A     | Self-adaption power supply:<br>AC220/240V;<br>50/60Hz;<br>100/115V;<br>50/60/400Hz; | 426×177×460<br>(without handles, pad, feet)      |

## Ordering Information

### System Instrument List

| Model       | Instrument Name                            | Main Indicators                     | Quantity | Remarks   |
|-------------|--|-------------------------------------|----------|---|
| 3672B/C/D/E | Vector network analyzer                    | 10MHz~26.5GHz/40GHz<br>/50GHz/67GHz | 1 set    | S80 option<br>S06 option                          |
| 3640A       | Millimeter wave spread spectrum controller | 8GHz~20GHz                          | 1 set    | For 2-port VNA                                    |
| 71802       | DC Block                                   | /                                   | 4 set    | For 4-port VNA essential                          |
| 71514B      | Attenuator                                 | 10dB attenuation                    | 4 set    | 3643K/3643NA/3643N/3643P for 4-port VNA essential |
| 3643K       | Millimeter-wave VNA extender               | 40GHz~60GHz                         | 2 sets   |   |
| 3643NA      | Millimeter-wave VNA extender               | 50GHz~75GHz                         | 2 sets   | -   |
| 3643N       | Millimeter-wave VNA extender               | 60GHz~90GHz                         | 2 sets   | -   |
| 3643P       | Millimeter-wave VNA extender               | 75GHz~110GHz                        | 2 sets   | -   |
| 3643QA      | Millimeter-wave VNA extender               | 90GHz~140GHz                        | 2 sets   | -   |
| 3643Q       | Millimeter-wave VNA extender               | 110GHz~170GHz                       | 2 sets   | -   |
| 3643SA      | Millimeter-wave VNA extender               | 140GHz~220GHz                       | 2 sets   | -   |
| 3643R       | Millimeter-wave VNA extender               | 170GHz~260GHz                       | 2 sets   | -   |
| 3643S       | Millimeter-wave VNA extender               | 220GHz~325GHz                       | 2 sets   | -   |
| 3643TA      | Millimeter-wave VNA extender               | 260GHz~400GHz                       | 2 sets   |   |
| 3649B       | Millimeter-wave VNA extender               | 325GHz~500GHz                       | 2 sets   | -   |

|        |                                   |               |       |   |
|--------|-----------------------------------|---------------|-------|---|
| 32121K | 6mm waveguide calibration kit     | 40GHz~60GHz   | 1 box | - |
| 32156  | 5mm waveguide calibration kit     | 50GHz~75GHz   | 1 box | - |
| 32155N | 60-90 waveguide calibration kit   | 60GHz~90GHz   | 1 box | - |
| 32141  | 3mm waveguide calibration kit     | 75GHz~110GHz  | 1 box | - |
| 32155Q | 90-140 waveguide calibration kit  | 90GHz~140GHz  | 1 box | - |
| 32155  | 2mm waveguide calibration kit     | 110GHz~170GHz | 1 box | - |
| 20301  | 1mm waveguide calibration kit     | 140GHz~220GHz | 1 box | - |
| 32155S | 170-260 waveguide calibration kit | 170GHz~260GHz | 1 box | - |
| 20302  | 1mm waveguide calibration kit     | 220GHz~325GHz | 1 box | - |
| 20301T | 0.5THz waveguide calibration kit  | 325GHz~500GHz | 1 box | - |

### System Cable Configuration Option

| Model    | Description                             | Function  | Remarks                                |
|----------|---|---|--|
| 364X-001 | System cable for 3640A controller       | connected with the controller, VNA and the S parameter module | 1 set. See the table below for details |
| 364X-002 | System cable for 3672B VNA (4-PORT)     | Frequency extender connection for 3672B VNA (4-PORT)          | 1 set. See the table below for details |
| 364X-003 | System cable for 3672C/D/E VNA (4-PORT) | Frequency extender connection for 3672 C/D/E VNA (4-PORT)     | 1 set. See the table below for details |

### Cable List of 3640A millimeter wave spread spectrum controller

| No.             | Cable Name and Function   | Length (meter) | Connector      | Quantity | Remarks                         |
|-----------------|---|----------------|----------------|----------|---------------------------------|
| Microwave Cable |   |                |                |          |                                 |
| A1              | RF output of network analyzer to RF input of control machine  | 0.6            | 3.5mm/3.5mm-JJ | 1        | Low loss cable                  |
| A2              | Local oscillator output of network analyzer to local oscillator input of control machine              | 0.6            | 3.5mm/3.5mm-JJ | 1        | Low loss cable                  |
| A3/A4           | RF output of control machine to input of millimeter-wave VNA extender.                                | 1.2/1.5/2      | 3.5mm/3.5mm-JJ | 2        | Low loss cable, length optional |
| A5/A6           | Local oscillator output of control machine to local oscillator input of millimeter-wave VNA extender. | 1.2/1.5/2      | 3.5mm/3.5mm-JJ | 2        | Low loss cable, length optional |
| IF Cable        |   |                |                |          |                                 |
| C1              | IF output of control machine to outer IF input of control machine                                     | 0.6            | SMA/SMA        | 4        | IF cable                        |
| C2              | IF output of millimeter-wave  | 1.2/1.5/2      | SMA/SMA        | 4        | IF cable, length                |

|                           |   |           |                           |   |                              |
|---------------------------|---|-----------|---------------------------|---|------------------------------|
|                           | VNA extender to IF input of control machine   |           |                           |   | optional                     |
| Communication/Power Cable |   |           |                           |   |                              |
| D1                        | Interface of network analyzer test device to interface of control machine test device | 1         | PCL-10125                 | 1 | Test device cable            |
| D2                        | Control machine power output to millimeter-wave VNA extender power input              | 1.2/1.5/2 | Circular connection cable | 2 | Power cable, length optional |

### Cable List of 3672B Vector Network Analyzer (Four-Port) Spread Spectrum System

| No.             | Cable Name and Function  | Length (meter) | Connector      | Quantity | Remarks        |
|-----------------|--|----------------|----------------|----------|----------------|
| Microwave Cable |  |                |                |          |                |
| A1-A4           | RF/LO input  | 1.2            | 3.5mm/3.5mm-KJ | 4        | Low loss cable |
| B1-B4           | IF output  | 1.8            | 3.5mm/3.5mm-JJ | 4        | IF cable       |
| Power Supply    |  |                |                |          |                |
| C1/C2           | Adapter power output to millimeter-wave VNA extender power input | /              | Seven core     | 2        | Power adapter  |

### Cable List of 3672C/D/E Vector Network Analyzer (Four-Port) Spread Spectrum System

| No.             | Cable Name and Function  | Length (meter) | Connector      | Quantity | Remarks        |
|-----------------|--|----------------|----------------|----------|----------------|
| Microwave Cable |  |                |                |          |                |
| A1-A4           | RF/LO input  | 1.2            | 2.4mm/3.5mm-KJ | 4        | Low loss cable |
| B1-B4           | IF output  | 1.8            | 3.5mm/3.5mm-JJ | 4        | IF cable       |
| Power Supply    |  |                |                |          |                |
| C1/C2           | Adapter power output to millimeter-wave VNA extender power input | /              | Seven core     | 2        | Power adapter  |

**Ceyear**  
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