

# VNA TEST CABLE ASSEMBLY

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For Vector Network Analyzers (VNA)

2023



**Maxwellon**

VNA test cable assembly is a high-performance phase stable test cable mainly utilized in vector network analyzers. It supports continually and frequently repeated bending. Hence it can be applied to high precision microwave electrical parameter testing under environments such as laboratory, production line, testing system etc. From DC to 67GHz, it provides extremely stable VSWR and insertion loss, extraordinary mechanic phase & amplitude stability and repeatedly connection

Additionally, high-precision NMD/APC connector in solid and light mechanical structure withstands bending, squeezing, twisting, stretching and other external forces while maintaining reliable performance. Dressing up with our special stainless steel double spiral strip + black nylon armor, the assembly can effectively extend the service life of the vector network analyzers.



### ■ Product Features

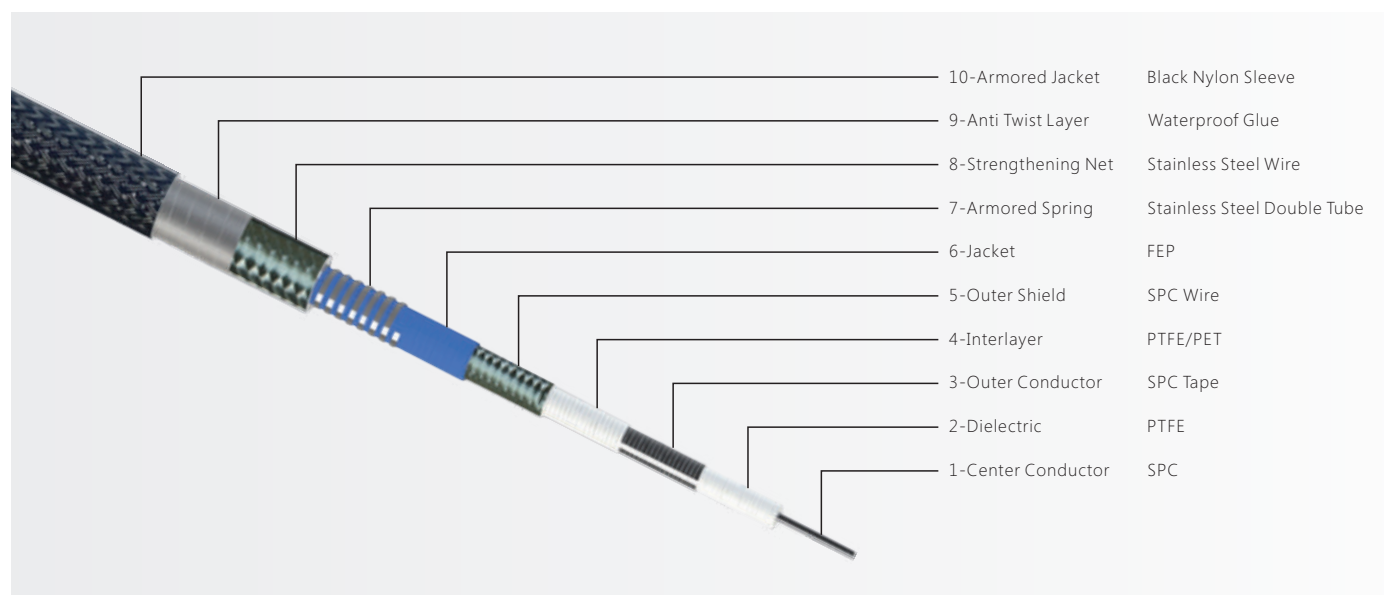
- Extremely accurate measurement with stable electrical performance up to 67GHz
- Same excellent phase & amplitude stability even at flexure
- Super robust cable, equipped with NMD connector, can withstand repeated mating, extrusion, twisting and bending, extraordinary reliability
- Extend the validity of utilization after calibration, reduce the repeated calibrations



### ■ Product Application

- Vector network analyzer
- Laboratory test
- Critical test& measurement

## VNA Cable Construction



## VNA Cable Assembly Specifications

### Electrical Specifications

| VNA Cable Type                    | V18  |      |      | V26  |      |      | V40  |      |      | V50  |      |      | V67  |      |      |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Operating Frequency (GHz)         | 18   |      |      | 26.5 |      |      | 40   |      |      | 50   |      |      | 67   |      |      |
| Cable Assembly Length (Inch)      | 25   | 38   | 48   | 25   | 38   | 48   | 25   | 38   | 48   | 25   | 38   | 48   | 25   | 38   | 48   |
| Typical VSWR                      | 1.18 |      |      | 1.18 |      |      | 1.25 |      |      | 1.25 |      |      | 1.35 |      |      |
| Maximum VSWR                      | 1.25 |      |      | 1.25 |      |      | 1.32 |      |      | 1.35 |      |      | 1.40 |      |      |
| Typical Insertion Loss (dB)       | 1.42 | 2.05 | 2.54 | 1.75 | 2.53 | 3.12 | 2.17 | 3.13 | 3.88 | 2.45 | 3.53 | 4.36 | 4.27 | 6.21 | 7.70 |
| Maximum Insertion Loss (dB)       | 1.77 | 2.41 | 2.90 | 2.16 | 2.93 | 3.53 | 2.66 | 3.62 | 4.37 | 2.98 | 4.07 | 4.90 | 4.59 | 6.54 | 8.03 |
| Typical Mechanical Phase (°)      | 2.0  | 2.0  | 3.0  | 2.0  | 2.0  | 3.0  | 1.5  | 3.0  | 3.0  | 1.5  | 4.0  | 4.0  | 4.0  | 5.0  | 7.0  |
| Maximum Mechanical Phase (°)      | 2.5  | 4.0  | 4.0  | 2.7  | 5.5  | 5.5  | 3.0  | 6.0  | 6.0  | 3.5  | 8.0  | 8.0  | 8.5  | 10.5 | 10.5 |
| Typical Mechanical Amplitude (dB) | 0.02 | 0.02 | 0.03 | 0.01 | 0.02 | 0.03 | 0.02 | 0.02 | 0.03 | 0.01 | 0.03 | 0.03 | 0.02 | 0.02 | 0.04 |
| Maximum Mechanical Amplitude (dB) | 0.08 | 0.10 | 0.10 | 0.08 | 0.10 | 0.10 | 0.08 | 0.10 | 0.10 | 0.08 | 0.10 | 0.13 | 0.10 | 0.13 | 0.20 |
| Impedance (Ω)                     | 50   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Shielding Effectiveness (dB)      | >100 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Velocity of Propagation           | 74%  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Time Delay (ns/cm)                | 4.5  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

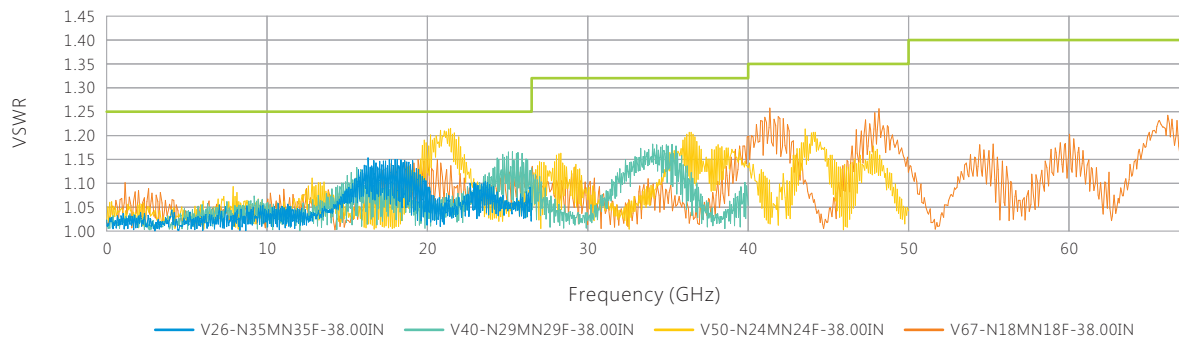
### Mechanical Specifications

| Outside Diameter of Armored Cable (mm)   | 14.8   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------------------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Minimum Bending Radius:Installation (mm) | 74     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Minimum Bending Radius:Repeated (mm)     | 148    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Weight (g/m)                             | 315    | 385 | 455 | 315 | 385 | 455 | 315 | 385 | 455 | 315 | 385 | 455 | 315 | 385 | 455 |
| Flexible Life (cycle)                    | >50000 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Crush Resistance (kgf/cm)                | >150   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

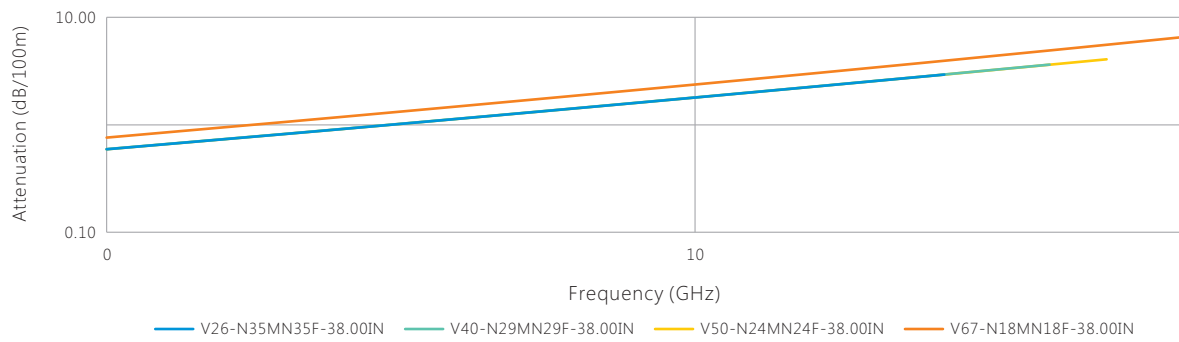
### Environmental Specifications

| Temperature Range (°C) | -40~+85 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|------------------------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

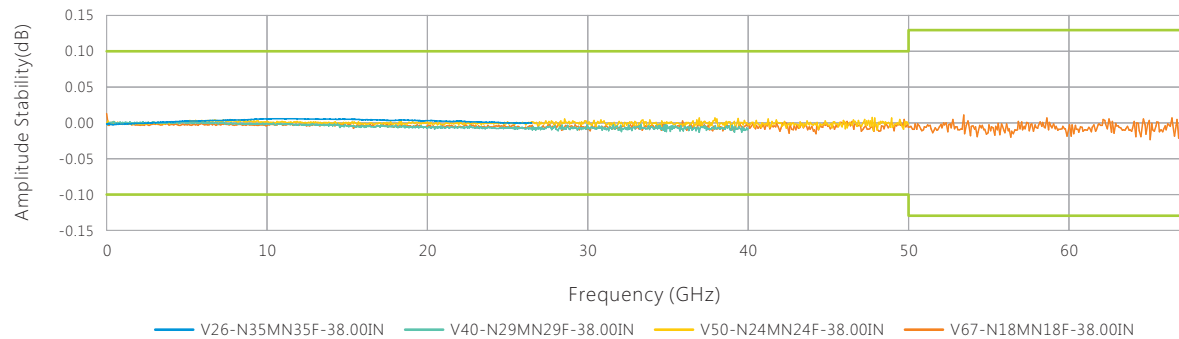
## ■ VSWR



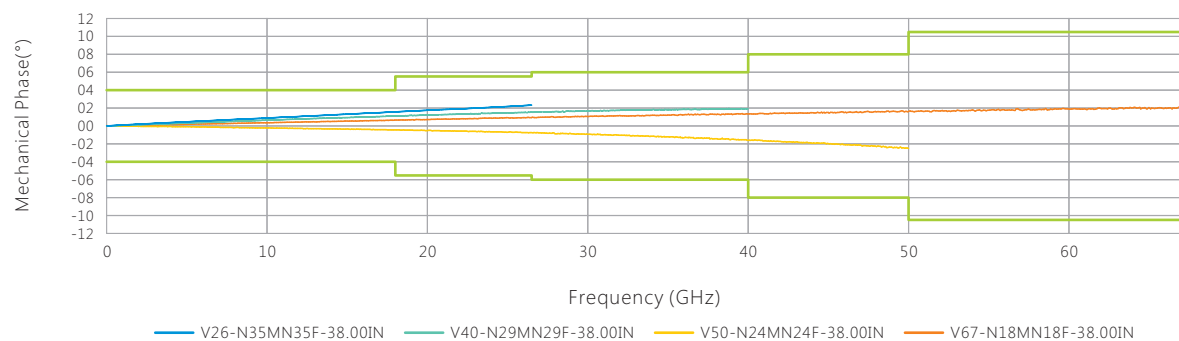
## ■ Frequency & Attenuation



## ■ Typical Value of Mechanical Amplitude Stability



## ■ Typical Value of Mechanical Phase Stability



## ■ Component Selection Information

|            |   |   |   |           |   |   |   |   |   |    |    |   |                   |    |    |    |      |    |
|------------|---|---|---|-----------|---|---|---|---|---|----|----|---|-------------------|----|----|----|------|----|
| 1          | 2 | 3 | - | 4         | 5 | 6 | 7 | 8 | 9 | 10 | 11 | - | 12                | 13 | 14 | 15 | 16   | 17 |
| Cable Type |   |   |   | Connector |   |   |   |   |   |    |    |   | Customized Length |    |    |    | Unit |    |

Digit 1-3: Cable type: V67/V50/V40/V26/V18

Digit 4-7: Left connector, e.g.: N18M

Digit 8-11: Right connector, e.g.: A35F

Digit 12-15: Customized length, e.g.: 1-"01.00"

Digit 16-17: Unit: IN-inch

For example: V67-N18FA18F-25.00IN

## ■ Connector Type



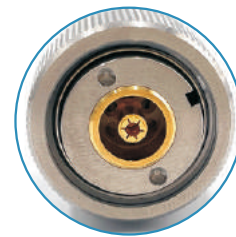
NMD FEMALE



NMD MALE



APC FEMALE



NMD 7M

## ■ Connector Selection

| VNA Cable Type |                   |                                | V67    | V50 | V40 | V26 | V18 |
|----------------|-------------------|--------------------------------|--------|-----|-----|-----|-----|
| Connector Code | Connector Type    | Operating Frequency / Diameter | 14.8mm |     |     |     |     |
| N18F           | NMD 1.85mm Female | 67GHz                          | ●      |     |     |     |     |
| A18F           | APC 1.85mm Female | 67GHz                          | ●      |     |     |     |     |
| N18M           | NMD 1.85mm Male   | 67GHz                          | ●      |     |     |     |     |
| N24F           | NMD 2.4mm Female  | 50GHz                          |        | ●   |     |     |     |
| A24F           | APC 2.4mm Female  | 50GHz                          |        | ●   |     |     |     |
| N24M           | NMD 2.4mm Male    | 50GHz                          |        | ●   |     |     |     |
| N29F           | NMD 2.92mm Female | 40GHz                          |        |     | ●   |     |     |
| A29F           | APC 2.92mm Female | 40GHz                          |        |     | ●   |     |     |
| N29M           | NMD 2.92mm Male   | 40GHz                          |        |     | ●   |     |     |
| N35F           | NMD 3.5mm Female  | 26.5GHz                        |        |     |     | ●   |     |
| A35F           | APC 3.5mm Female  | 26.5GHz                        |        |     |     | ●   |     |
| N35M           | NMD 3.5mm Male    | 26.5GHz                        |        |     |     | ●   |     |
| 7M             | NMD 7mm           | 18GHz                          |        |     |     |     | ●   |

## ■ VNA 67GHz Series Cable Assemblies-Fast Delivery of Standard Products

| Product Code | Products Designation | Connector A       | Connector B       | Length    | Frequency | VSWR | Insertion Loss | Mechanical Phase | Mechanical Amplitude |
|--------------|----------------------|-------------------|-------------------|-----------|-----------|------|----------------|------------------|----------------------|
| T-CA21-10151 | V67-N18FA18F-25.00IN | NMD 1.85mm Female | APC 1.85mm Female | 25 inches | 67GHz     | 1.40 | 4.59dB         | ±8.5°            | ±0.10dB              |
| T-CA21-10152 | V67-N18MN18F-25.00IN | NMD 1.85mm Male   | NMD 1.85mm Female | 25 inches | 67GHz     | 1.40 | 4.59dB         | ±8.5°            | ±0.10dB              |
| T-CA21-10153 | V67-N18FA18F-38.00IN | NMD 1.85mm Female | APC 1.85mm Female | 38 inches | 67GHz     | 1.40 | 6.54dB         | ±10.5°           | ±0.13dB              |
| T-CA21-10154 | V67-N18MN18F-38.00IN | NMD 1.85mm Male   | NMD 1.85mm Female | 38 inches | 67GHz     | 1.40 | 6.54dB         | ±10.5°           | ±0.13dB              |
| T-CA21-10155 | V67-N18FA18F-48.00IN | NMD 1.85mm Female | APC 1.85mm Female | 48 inches | 67GHz     | 1.40 | 8.03dB         | ±10.5°           | ±0.20dB              |
| T-CA21-10156 | V67-N18MN18F-48.00IN | NMD 1.85mm Male   | NMD 1.85mm Female | 48 inches | 67GHz     | 1.40 | 8.03dB         | ±10.5°           | ±0.20dB              |

## ■ VNA 50GHz Series Cable Assemblies-Fast Delivery of Standard Products

| Product Code | Products Designation | Connector A      | Connector B      | Length    | Frequency | VSWR | Insertion Loss | Mechanical Phase | Mechanical Amplitude |
|--------------|----------------------|------------------|------------------|-----------|-----------|------|----------------|------------------|----------------------|
| T-CA21-10157 | V50-N24FA24F-25.00IN | NMD 2.4mm Female | APC 2.4mm Female | 25 inches | 50GHz     | 1.35 | 2.98dB         | ±3.5°            | ±0.08dB              |
| T-CA21-10158 | V50-N24MN24F-25.00IN | NMD 2.4mm Male   | NMD 2.4mm Female | 25 inches | 50GHz     | 1.35 | 2.98dB         | ±3.5°            | ±0.08dB              |
| T-CA21-10159 | V50-N24FA24F-38.00IN | NMD 2.4mm Female | APC 2.4mm Female | 38 inches | 50GHz     | 1.35 | 4.07dB         | ±8.0°            | ±0.10dB              |
| T-CA21-10160 | V50-N24MN24F-38.00IN | NMD 2.4mm Male   | NMD 2.4mm Female | 38 inches | 50GHz     | 1.35 | 4.07dB         | ±8.0°            | ±0.10dB              |
| T-CA21-10161 | V50-N24FA24F-48.00IN | NMD 2.4mm Female | APC 2.4mm Female | 48 inches | 50GHz     | 1.35 | 4.90dB         | ±8.0°            | ±0.13dB              |
| T-CA21-10162 | V50-N24MN24F-48.00IN | NMD 2.4mm Male   | NMD 2.4mm Female | 48 inches | 50GHz     | 1.35 | 4.90dB         | ±8.0°            | ±0.13dB              |

## ■ VNA 40GHz Series Cable Assemblies-Fast Delivery of Standard Products

| Product Code | Products Designation | Connector A       | Connector B       | Length    | Frequency | VSWR | Insertion Loss | Mechanical Phase | Mechanical Amplitude |
|--------------|----------------------|-------------------|-------------------|-----------|-----------|------|----------------|------------------|----------------------|
| T-CA21-10163 | V40-N29FA29F-25.00IN | NMD 2.92mm Female | APC 2.92mm Female | 25 inches | 40GHz     | 1.32 | 2.66dB         | ±3.0°            | ±0.08dB              |
| T-CA21-10164 | V40-N29MN29F-25.00IN | NMD 2.92mm Male   | NMD 2.92mm Female | 25 inches | 40GHz     | 1.32 | 2.66dB         | ±3.0°            | ±0.08dB              |
| T-CA21-10165 | V40-N29FA29F-38.00IN | NMD 2.92mm Female | APC 2.92mm Female | 38 inches | 40GHz     | 1.32 | 3.62dB         | ±6.0°            | ±0.10dB              |
| T-CA21-10166 | V40-N29MN29F-38.00IN | NMD 2.92mm Male   | NMD 2.92mm Female | 38 inches | 40GHz     | 1.32 | 3.62dB         | ±6.0°            | ±0.10dB              |
| T-CA21-10167 | V40-N29FA29F-48.00IN | NMD 2.92mm Female | APC 2.92mm Female | 48 inches | 40GHz     | 1.32 | 4.37dB         | ±6.0°            | ±0.10dB              |
| T-CA21-10168 | V40-N29MN29F-48.00IN | NMD 2.92mm Male   | NMD 2.92mm Female | 48 inches | 40GHz     | 1.32 | 4.37dB         | ±6.0°            | ±0.10dB              |

## ■ VNA 26.5GHz Series Cable Assemblies-Fast Delivery of Standard Products

| Product Code | Products Designation | Connector A      | Connector B      | Length    | Frequency | VSWR | Insertion Loss | Mechanical Phase | Mechanical Amplitude |
|--------------|----------------------|------------------|------------------|-----------|-----------|------|----------------|------------------|----------------------|
| T-CA21-10169 | V26-N35FA35F-25.00IN | NMD 3.5mm Female | APC 3.5mm Female | 25 inches | 26.5GHz   | 1.25 | 2.16dB         | ±2.7°            | ±0.08dB              |
| T-CA21-10170 | V26-N35MN35F-25.00IN | NMD 3.5mm Male   | NMD 3.5mm Female | 25 inches | 26.5GHz   | 1.25 | 2.16dB         | ±2.7°            | ±0.08dB              |
| T-CA21-10171 | V26-N35FA35F-38.00IN | NMD 3.5mm Female | APC 3.5mm Female | 38 inches | 26.5GHz   | 1.25 | 2.93dB         | ±5.5°            | ±0.10dB              |
| T-CA21-10172 | V26-N35MN35F-38.00IN | NMD 3.5mm Male   | NMD 3.5mm Female | 38 inches | 26.5GHz   | 1.25 | 2.93dB         | ±5.5°            | ±0.10dB              |
| T-CA21-10173 | V26-N35FA35F-48.00IN | NMD 3.5mm Female | APC 3.5mm Female | 48 inches | 26.5GHz   | 1.25 | 3.53dB         | ±5.5°            | ±0.10dB              |
| T-CA21-10174 | V26-N35MN35F-48.00IN | NMD 3.5mm Male   | NMD 3.5mm Female | 48 inches | 26.5GHz   | 1.25 | 3.53dB         | ±5.5°            | ±0.10dB              |

## ■ VNA 18GHz Series Cable Assemblies-Fast Delivery of Standard Products

| Product Code | Products Designation | Connector A | Connector B | Length    | Frequency | VSWR | Insertion Loss | Mechanical Phase | Mechanical Amplitude |
|--------------|----------------------|-------------|-------------|-----------|-----------|------|----------------|------------------|----------------------|
| T-CA21-10175 | V18-7M7M-25.00IN     | NMD 7mm     | NMD 7mm     | 25 inches | 18GHz     | 1.25 | 1.77dB         | ±2.5°            | ±0.08dB              |
| T-CA21-10176 | V18-7M7M-38.00IN     | NMD 7mm     | NMD 7mm     | 38 inches | 18GHz     | 1.25 | 2.41dB         | ±4.0°            | ±0.10dB              |
| T-CA21-10177 | V18-7M7M-48.00IN     | NMD 7mm     | NMD 7mm     | 48 inches | 18GHz     | 1.25 | 2.90dB         | ±4.0°            | ±0.10dB              |



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