

# LPHF Rotary Joints



| Electrical & Electronics |                          | Mechanical             |   | Environmental               |                                     |
|--------------------------|--------------------------|------------------------|---|-----------------------------|-------------------------------------|
| Channels                 | 1/2/3/4(optiongal)       | Rotating speed         | 0-500rpm  | Working temperature         | Industrial: -40°C~+75°C             |
| Frequency range          | 1CH:≤50GHz<br>2CH:≤18GHz | Lifetime               | 10million revolutions   |                             | Military: -55°C~+85°C               |
| Inserfaces               | SMA/N/3.5/2.92/2.4/F     | Interface loads ,max   | ±5N(axial)<br>±5N(radial)   | Storage ambient temperature | -50 ~ 85°C                          |
| VSWR,max                 | 1.2(Minimum)             | Torque during rotation | 1N.cm(Minimum)  | Relative humidity           | ≤95%<br>(condensation not allowed)  |
| Insertion loss,max       | 0.25dB(Minimum)          | Contact material       | Precious metal  |                             |                                     |
| Peak power,max           | 10KW(Maximum)            | Case material          | Aluminum alloy/<br>stainless steel/brass  | IP protection level         | IP 40<br>(High protection optional) |
| Isolation,min            | 50dB                     | Surface material       | Conductive oxidation/<br>passivation/<br>nickel plating/<br>piating termary alloy |                             |                                     |

## Brief Introduction

High Frequency Rotary Joint is applied in constant rotating devices. It transmits high frequency signal and high speed signal from stationary part to rotary part. This rotary joint is able to transfer analog signals and high-speed digital signals with frequencies up to 500MHz-50GHz. It is compact in structure, stable in performance with good shielding effect, and low interference. Besides, high frequency slip ring can be easily installed in other applications.

This series consists of high frequency slip ring and high frequency electric hybrid slip ring

### Features:

- Up to 4 circuits (model with more circuits is customizable)
- Frequency up to 50GHz
- Compact structure with low interference
- Transmit multifarious signals simultaneously
- Ultra low insertion loss and transmission fluctuation
- Long service life and maintenance-free

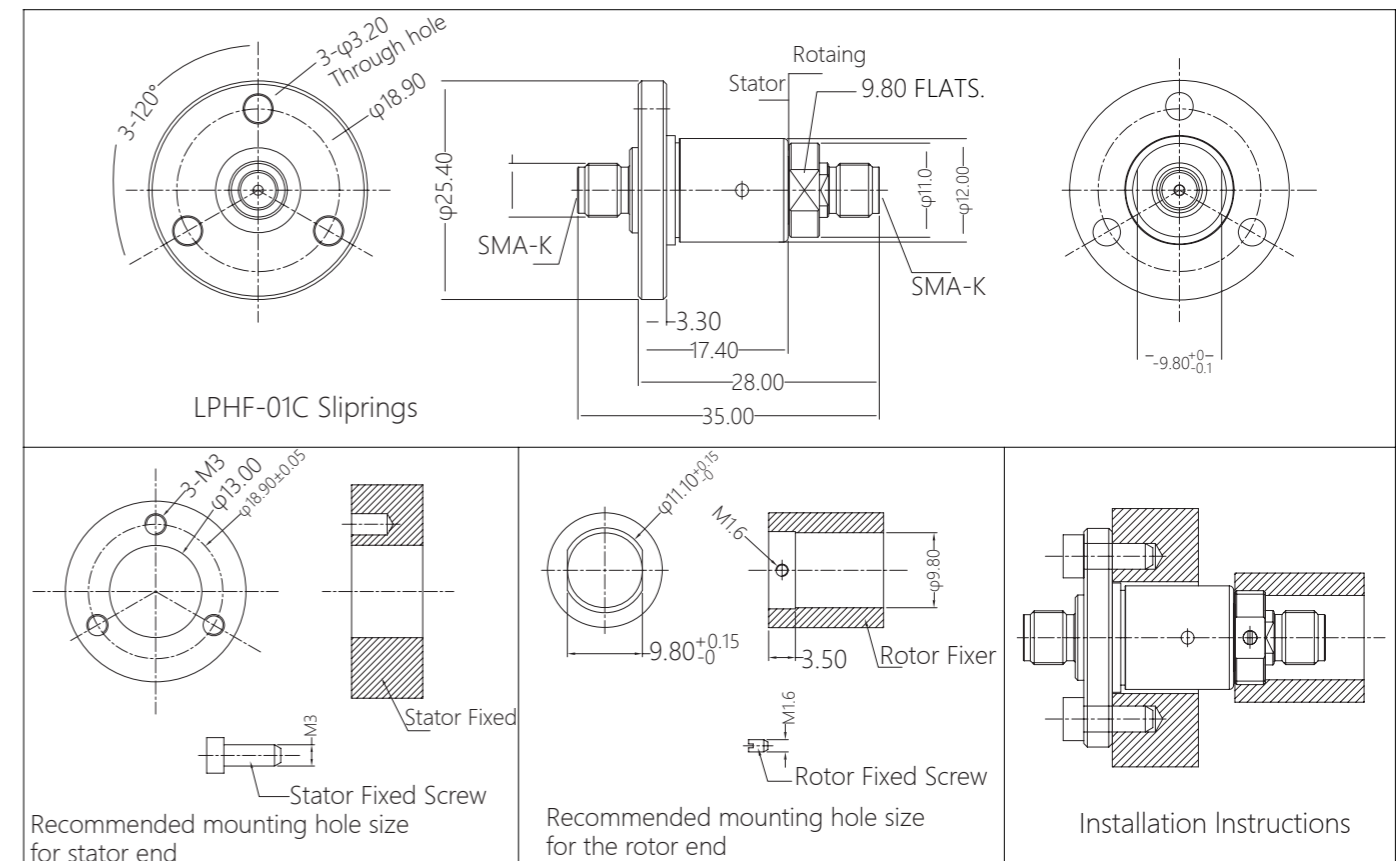
### Options:

- Number of circuits
- High frequency range
- Voltage and current
- Integrated transmission of high frequency signal and power signal or other signals

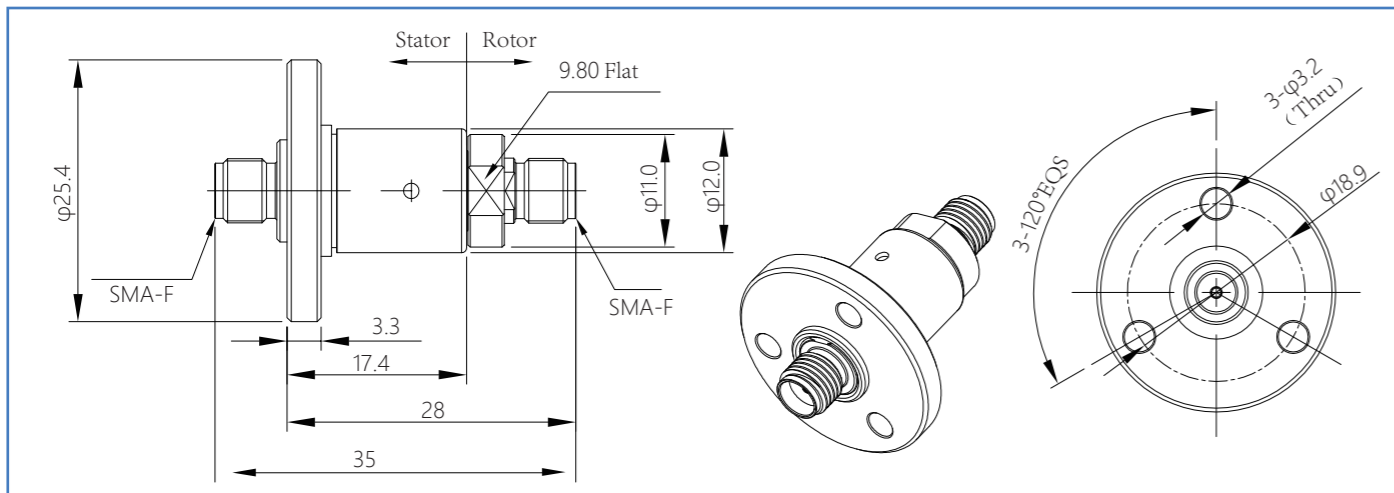
### Applications:

- Radar antenna, military system devices
- HD network video surveillance system
- Satellite communication system
- Medical treatment instrument
- Air traffic control and missile defense system

## Installation Instructions



## LPHF-01C Outline drawing



### Specifications

|                              |                                  |                               |                 |
|------------------------------|----------------------------------|-------------------------------|-----------------|
| Interface Type               | SMA-F(50 $\Omega$ )              | Axial load on Interface, Max  | $\pm 2$ N       |
| Frequency Range              | DC-18GHz                         | Radial Load on Interface, Max | $\pm 2$ N       |
| VSWR, Max                    | 1.3@DC-12GHz<br>1.4@12-18GHz     | Body Material                 | Stainless Steel |
| VSWR WOW                     | 0.05                             | Insulator Material            | PTFE            |
| Insertion loss, Max.         | 0.3dB@DC-12GHz<br>0.4dB@12-18GHz | Marking                       | Laser marking   |
| Insertion loss WOW           | 0.05dB                           | Weight                        | 25.4g           |
| Peak Power, Max.             | 3KW                              | IP Protection Level           | IP40            |
| Maximum speed                | 2000rpm                          | Operation Temperature         | -45~+80°C       |
| Average Power, Max           | 200W@1GHz/30W@18GHz              | Storage Temperature           | -55~+85°C       |
| Phase WOW, Max               | 1°                               | Rotating Speed, Max.          | 300rpm          |
| Humidity (Operation)         | 95%                              | Humidity (Storage)            | 95%             |
| Life Time, Min.              | 10 Million Revolutions           | Starting Torque               | 2Ncm Max        |
| Continuous Rotational Torque |                                  | 2Ncm Max                      |                 |

## Features

### Independent Research and Development

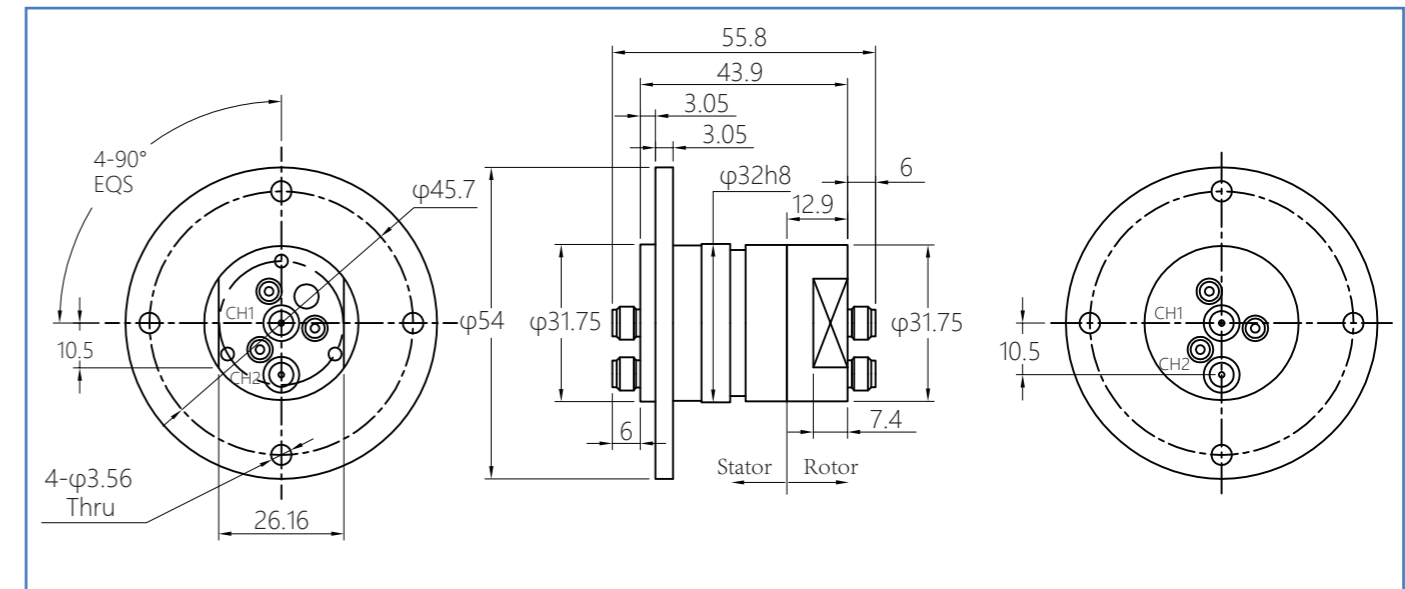
#### Key Challenges

- ▶ Characteristic impedance transition matching design
- ▶ Contact material wear resistance technology
- ▶ Precision machining and assembly of miniature parts
- ▶ Off-axis channel RF rotation coupling technology
- ▶ Blind operation low temperature welding process
- ▶ High isolation design

#### Core Technology

- ▶ RF simulation optimization technology
- ▶ Self-lubricating contact material and lubricant process
- ▶ Multi-channel RF slip ring design ideas
- ▶ High power slip ring design technology

## LPHF-02A Outline drawing



### Specifications

| Chana1                                | Chana1 1                      | Chana1 2                      | Starting Torque              | 5Ncm@ room temperature   |
|---------------------------------------|-------------------------------|-------------------------------|------------------------------|--------------------------|
| Interface Type                        | SMA-F(50ohm)                  | SMA-F(50ohm)                  | Continuous Rotational Torque | 5Ncm@ room temperature   |
| Type                                  | I                             | I                             | Rotating Speed, Max.         | 60rpm                    |
| Frequency Range                       | DC-4.5GHz                     | DC-4.5GHz                     | Life Time, Min               | 10 million Revolutions   |
| Peak Power, Max.                      | 1000W                         | 1000W                         | Body Material                | Aluminum alloy           |
| Average Power, Max                    | 60W@4.5GHz                    | 10W                           | Case surface finish          | Chromate conversion coat |
| VSWR, Max                             | 1.2                           | 1.5                           | Weight                       | 0.13Kg                   |
| VSWR, WOW                             | 0.05                          | 0.2                           | IP Protection Level          | IP60                     |
| Insertion Loss, Max.                  | 0.25dB                        | 0.3dB                         | Operation Temperature        | -45~+80°C                |
| Insertion Loss, WOW                   | 0.05dB                        | 0.15dB                        | Storage Temperature          | -55~+85°C                |
| DC capability, max (one channel only) | 0.5A, 48VDC@full RF avg.power | 0.5A, 24VDC@full RF avg.power | Humidity(Operation)          | 95%                      |
| Phase WOW                             | 0.5deg                        | 4.0deg                        | Humidity(Storage)            | 95%                      |
| Isolation, min                        |                               | 50dB                          | /                            |                          |

### Slip Ring Performance and Quality

- ▶ Slip ring life is not lower than similar products
- ▶ Multi-channel slip ring insertion loss index is better than similar products
- ▶ Multi-channel slip ring size is smaller than similar products

### Product Delivery

- ▶ Significantly shorten the delivery period compared to imported products; General single-channel products are delivered for 1-2 weeks, multi-channel products are delivered for 2-4 weeks

### Cost Performance

- ▶ Cost-effective compared to similar imported products

## LPHF Rotary Joints

|                | Model         | Channel  | Interface     | Frequency range | Peak power, max | Average power, max                    | VSWR, max   | Insertion loss, max   | Isolation, min |      |
|----------------|---------------|----------|---------------|-----------------|-----------------|---------------------------------------|---|---|----------------|------|
| Single-Channel | LPCC-01A      | 1        | Optional      | DC-3GHz         | 1000W           | 20W@3GHz                              | 1.5@0-3GHz  | 1.2dB@3GHz<br>( 250mm/250mm )                                   | /              |      |
|                | LPCC-02A      | 1        | Optional      | DC-3GHz         | 1000W           | 20W@3GHz                              | 1.6@0-3GHz  | 1.2dB@3GHz<br>( 250mm/250mm )                                   | /              |      |
|                | LPCC-01B      | 1        | Optional      | DC-6GHz         | 800W            | 10W@6GHz                              | 1.5@6GHz  | 1.8dB@0-6G<br>( 250mm/250mm )                                   | /              |      |
|                | LPHF-01A      | 1        | SMA-f(50Ω)    | DC-18GHz        | 1500W           | 200W@1GHz<br>30W@18GHz                | 1.20@0-6GHz<br>1.25@6-12GHz<br>1.35@12-18GHz            | 0.25dB@0-6GHz<br>0.3dB@6-12GHz<br>0.5dB@12-18GHz                | /              |      |
|                | LPHF-01C      | 1        | SMA-f(50Ω)    | DC-18GHz        | 3000W           | 200W@1GHz<br>30W@18GHz                | 1.2@0-6GHz<br>1.3@6-12GHz<br>1.4@12-18GHz               | 0.25dB@0-6GHz<br>0.3dB@6-12GHz<br>0.4dB@12-18GHz                | /              |      |
|                | LPHF-01E      | 1        | 3.5mm-f(50Ω)  | DC-26.5GHz      | 3000W           | 200W@1GHz<br>50W@18GHz<br>30W@26.5GHz | 1.30@0-12GHz<br>1.35@12-18GHz<br>1.7@18-26.5GHz         | 0.3dB@0-12GHz<br>0.35dB@12-18GHz<br>0.7dB@18-26.5GHz            | /              |      |
|                | LPHF-01F      | 1        | 2.92mm-f(50Ω) | DC-40GHz        | 500W            | 50W@2GHz<br>2W@18GHz<br>1W@40GHz      | 1.4@0-18GHz<br>1.7@18-26.5GHz<br>2.0@26.5-40GHz         | 0.5dB@0-18GHz<br>1.0dB@18-26.5GHz<br>1.2dB@26.5-40GHz           | /              |      |
|                | LPHF-01G      | 1        | 2.4mm-f(50Ω)  | DC-50GHz        | 1000W           | 50W@1GHz<br>15W@10GHz<br>3W@50GHz     | 1.3@0-10GHz<br>1.4@10-26.5GHz<br>1.7@26.5-50GHz         | 0.3dB@0-10GHz<br>0.5dB@10-26.5GHz<br>0.9dB@26.5-50GHz           | /              |      |
|                | LPHF-01H      | 1        | N-f(50Ω)      | DC-18GHz        | 10000W          | 200W@1GHz<br>100W@8GHz<br>70W@18GHz   | 1.2@0-10GHz<br>1.3@10-18GHz                             | 0.2dB@0-10GHz<br>0.3dB@10-18GHz                                 | /              |      |
|                | LPHF-01L      | 1        | 2.92mm-f(50Ω) | DC-40GHz        | 500W            | 50W@2GHz<br>2W@18GHz<br>1W@40GHz      | 1.4@0-18GHz<br>1.7@18-26.5GHz<br>2.0@26.5-40GHz         | 0.5dB@0-18GHz<br>1.0dB@18-26.5GHz<br>1.2dB@26.5-40GHz           | /              |      |
|                | LPHF-01M      | 1        | SMA-f(50Ω)    | DC-18GHz        | 3000W           | 200W@1GHz                             | 1.35@0-10GHz<br>1.5@10-18GHz                            | 0.3dB@0-10GHz<br>0.4dB@10-18GHz                                 | /              |      |
|                | Multi-Channel | LPHF-02A | 2             | SMA-f(50Ω)      | DC-4.5GHz       | 1000W                                 | 60W@4.5GHz  | 1.2   | 0.25dB         | 50dB |
|                |               |          |               | SMA-f(50Ω)      | DC-4.5GHz       | 1000W                                 | 10W   | 1.5   | 0.3dB          |      |
| LPHF-02B       |               | 2        | SMA-f(50Ω)    | DC-18GHz        | 1000W           | 200W@1GHz                             | 1.3@0-8GHz<br>1.5@4-18GHz                               | 0.4dB@0-4GHz<br>0.9dB@4-18GHz                                   | 50dB           |      |
|                |               |          | SMA-f(50Ω)    | DC-4GHz         | 1000W           | 200W@1GHz                             | 1.5   | 0.5dB   |                |      |
| LPHF-02C       |               | 2        | SMA-f(50Ω)    | DC-18GHz        | 1000W           | 100W@2GHz<br>60W@8GHz<br>10W@18GHz    | 1.35@0-8GHz<br>1.5@8-18GHz                              | 0.4dB@0-8GHz<br>0.9dB@8-18GHz                                   | 50dB           |      |
|                |               |          | SMA-f(50Ω)    | DC-13GHz        | 1000W           | 10W                                   | 1.6@0-4GHz<br>1.8@4-8GHz<br>2.0@8-13GHz                 | 0.5dB@0-4GHz<br>0.7dB@4-8GHz<br>1.0dB@8-13GHz                   |                |      |
| LPHF-02D       |               | 2        | 2.92-f(50Ω)   | DC-18GHz        | 1000W           | 100W@2GHz<br>35W@8GHz<br>10W@18GHz    | 1.35@0-8GHz<br>1.5@8-18GHz                              | 0.4dB@0-8GHz<br>1.0dB@8-18GHz                                   | 50dB           |      |
|                |               |          | 2.92-f(50Ω)   | DC-18GHz        | 1000W           | 10W                                   | 2.0@0-4GHz<br>2.5@4-8GHz<br>3.5@8-12GHz<br>4.5@12-18GHz | 0.5dB@0-4GHz<br>1.0dB@4-8GHz<br>2.0dB@8-12GHz<br>3.5dB@12-18GHz |                |      |
| LPHF-02E       |               | 2        | SMA-f(50Ω)    | DC-5GHz         | 1000W           | 60W@5GHz                              | 1.2   | 0.25dB  | 50dB           |      |
|                |               |          | SMA-f(50Ω)    | DC-5GHz         | 1000W           | 10W                                   | 1.5   | 0.45dB  |                |      |

## LPHF Rotary Joints

|               | Model      | Channel | Interface  | Frequency range | Peak power, max | Average power, max                 | VSWR, max                  | Insertion loss, max           | Isolation, min. |
|---------------|------------|---------|------------|-----------------|-----------------|------------------------------------|----------------------------|-------------------------------|-----------------|
| Multi-Channel | LPHF-02F   | 2       | SMA-f(50Ω) | DC-18GHz        | 1000W           | 100W@2GHz<br>35W@8GHz<br>10W@18GHz | 1.35@0-8GHz<br>1.5@8-18GHz | 0.5dB@0-8GHz<br>1.0dB@8-18GHz | 50dB            |
|               |            |         | SMA-f(50Ω) | DC-13GHz        | 1000W           | 10W                                | 1.6@0-5GHz<br>2.0@5-13GHz  | 0.6dB@0-5GHz<br>1.2dB@5-13GHz |                 |
|               | LPHF-02G   | 2       | SMA-f(50Ω) | DC-8GHz         | 1000W           | 200W@1GHz                          | 1.2@0-4GHz<br>1.3@4-8GHz   | 0.2dB@0-4GHz<br>0.4dB@4-8GHz  | 50dB            |
|               |            |         | SMA-f(50Ω) | DC-8GHz         | 1000W           | 10W                                | 1.8@0-4GHz<br>2.2@4-8GHz   | 0.5dB@0-4GHz<br>0.8dB@4-8GHz  |                 |
|               | LPHF-03A   | 3       | SMA-f(50Ω) | DC-3GHz         | 1000W           | 10W                                | 1.3                        | 0.4dB                         | 60dB            |
|               |            |         | SMA-f(50Ω) | DC-3GHz         | 1000W           | 50W@1GHz                           | 2.0                        | 0.7dB                         |                 |
|               |            |         | SMA-f(50Ω) | DC-3GHz         | 1000W           | 50W@1GHz                           | 2.0                        | 0.4dB                         |                 |
|               | LPHF-03B   | 3       | TNC(50Ω)   | DC-3GHz         | 3000W           | 100W                               | 1.7                        | 0.75dB                        | 60dB            |
|               |            |         | TNC(50Ω)   | DC-3GHz         | 3000W           | 30W                                | 1.7                        | 0.75dB                        |                 |
|               |            |         | TNC(50Ω)   | DC-3GHz         | 3000W           | 30W                                | 1.3                        | 0.75dB                        |                 |
|               | LPHF-04A   | 4       | SMA-f(50Ω) | DC-4GHz         | 1000W           | 50W                                | 1.3                        | 1.0dB                         | 55dB            |
|               |            |         | SMA-f(50Ω) | DC-4GHz         | 1000W           | 10W                                | 1.5                        | 1.0dB                         |                 |
|               |            |         | SMA-f(50Ω) | DC-4GHz         | 1000W           | 10W                                | 1.5                        | 1.0dB                         |                 |
| SMA-f(50Ω)    |            |         | DC-4GHz    | 1000W           | 10W             | 1.5                                | 1.0dB                      |                               |                 |
| Integrated    | LPC-1C1202 | 1       | Optional   | DC-3GHz         | 1000W           | 20W@3GHz                           | 1.6@0-3GHz                 | 1.2dB@3GHz<br>( 250mm/250mm ) | /               |
|               | LPC-1C2402 | 1       | Optional   | DC-3GHz         | 1000W           | 20W@3GHz                           | 1.6@0-3GHz                 | 1.2dB@3GHz<br>( 250mm/250mm ) | /               |
|               | LPC-1C3002 | 1       | Optional   | DC-3GHz         | 1000W           | 20W@3GHz                           | 1.6@0-3GHz                 | 1.2dB@3GHz<br>( 250mm/250mm ) | /               |
|               | LPC-1C3602 | 1       | Optional   | DC-3GHz         | 1000W           | 20W@3GHz                           | 1.6@0-3GHz                 | 1.2dB@3GHz<br>( 250mm/250mm ) | /               |