



## Train, Vehicle & RTPI Antennas



## Antenna Product Catalogue

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## Train & Vehicle RTPI Antennas

| Code    | Description                        | Frequency band (MHz) |     |     |     |      |      |      |      | Gain (dBd) | Page |      |      |
|---------|------------------------------------|----------------------|-----|-----|-----|------|------|------|------|------------|------|------|------|
|         |                                    | B8                   | 500 | 800 | 900 | 1700 | 1900 | 2200 | 2400 |            |      | 5000 | 6000 |
| 401     | VHF low profile vehicle antenna    |                      | ●   |     |     |      |      |      |      |            |      | 0    | 3    |
| 403.02  | VHF low profile vehicle antenna    |                      | ●   |     |     |      |      |      |      |            |      | 0    | 4    |
| 403.10  | Multi-element RTPI vehicle antenna | ●                    | ●   | ■   | ■   | ■    | ■    | ■    | ■    | ■          |      | -    | 5    |
| 452     | UHF/GSM dual band vehicle antenna  |                      | ■   | ■   |     |      |      |      |      |            |      | 0    | 6    |
| 472     | UHF vehicle antenna                |                      | ■   |     |     |      |      |      |      |            |      | 0    | 7    |
| 4142    | GSM vehicle antenna                |                      |     | ■   |     |      |      |      |      |            |      | 0    | 8    |
| 4142.09 | GSM / GPS ehicle antenna           |                      |     | ■   |     |      |      |      |      |            |      | 0    | 9    |
| 4172    | GSM vehicle antenna                |                      |     | ■   |     |      |      |      |      |            |      | 0    | 10   |

These antennas are omni-directional, and suited for operation on vehicles in harsh environments. Using a single-piece cast aluminium quarter wave slot for radiating, they are short and very robust. They are d.c. grounded, and intended for installation on conductive surfaces for correct operation. The 401 has a polyester coated grey finish..

## Electrical & mechanical specifications

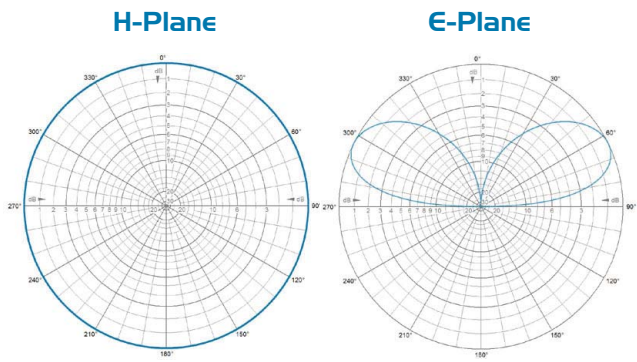


|                                       |                              |
|---------------------------------------|------------------------------|
| <b>Frequency range</b>                | 158-162MHz                   |
| <b>Input impedance</b>                | 50Ω                          |
| <b>Bandwidth</b>                      | ±2.5% of centre frequency    |
| <b>VSWR</b>                           | <2.0:1                       |
| <b>Maximum input power</b>            | 500 Watts                    |
| <b>Polarisation</b>                   | Vertical                     |
| <b>Forward gain</b>                   | 0 dBd                        |
| <b>3 dB Beamwidth</b>                 | <b>E Plane</b> 90°           |
|                                       |                              |
| <b>Connection</b>                     | 'N' type socket              |
| <b>Element</b>                        | Diecast aluminium alloy LM25 |
| <b>Finish</b>                         | Baked polyester coating grey |
| <b>Insulator</b>                      | Nylon                        |
| <b>Lightning / HT line protection</b> | Direct Grounded              |
| <b>Minimum ground plane</b>           | 1.25 x 1.25m                 |
| <b>Typical weight</b>                 | 3 kg                         |
| <b>Dimensions</b>                     | 550 x 145 x 70               |
| <b>Typical wind loading @ 45m/s</b>   | 38 N                         |

**Free space radiation patterns**

**Mounting accessories**

**Standard stock models**



|                     |                  |
|---------------------|------------------|
| <b>Stock code</b>   | <b>Frequency</b> |
| <b>40I.01.05.00</b> | 158-162MHz       |

The 403.02 is a low profile VHF vehicle antenna, ideal for heavy duty transport logistics on buses and trucks. The unique radiator design offers minimal loss of efficiency when compared with a standard quarter-wave antenna, and consistent gain across transmit and receive bands. The antenna elements are protected by a tough ABS radome and is fixed to the vehicle with two robust mounting studs, which also provide a cable exit point from the antenna. The VHF element can be supplied pre-tuned or with on-site tuning capability across a pre-set bandwidth. Cabling and connector configuration options are available on the 403.02 including FAKRA automotive standard connectors.

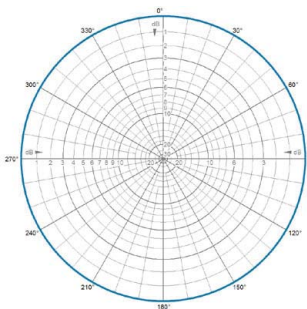
### Electrical & mechanical specifications



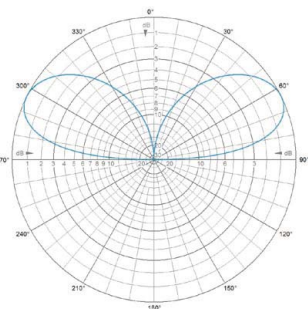
|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Frequency range</b>             | 138-220MHz (3-4MHz Tx bandwidth)   |
| <b>Input impedance</b>             | 50Ω                                |
| <b>VSWR</b>                        | <2.0:1                             |
| <b>Maximum input power</b>         | 50 Watts                           |
| <b>Polarisation</b>                | Vertical                           |
| <b>Gain</b>                        | 1dBi                               |
| <b>Grounding</b>                   | Direct grounded                    |
| <b>Ground plane required</b>       | Typical 1.2m x 1.2m                |
| <b>Connection</b>                  | Cables / connector to requirements |
| <b>Dimensions</b>                  | 673 x 144 x 62mm                   |
| <b>Mounting holes</b>              | 2 x 25mm holes, 517mm centres      |
| <b>Weight</b>                      | 1.5kg approx                       |
| <b>Housing material</b>            | ABS                                |
| <b>Other materials</b>             | Aluminium, PTFE, Brass, Nylon      |
| <b>Colour</b>                      | Traffic White RAL9016              |
| <b>Operating temperature range</b> | -30°C to +70°C                     |
| <b>Storage temperature range</b>   | -50°C to +70°C                     |
| <b>Relative humidity</b>           | 5% to 95%RH                        |
| <b>Water resistance</b>            | To IP67 (external, when installed) |

#### Free space radiation patterns

H-Plane



E-Plane



#### Mounting accessories

#### Standard stock models

**Stock code** | **Frequency**

Manufactured to requirements

The 403 series comprise separate optional elements for VHF, UHF, GSM/GPRS, WLAN (802.11a,b,g), GPS and UMTS/3G in one unit, configurable with any combination of these radiators. The antenna is ideal for heavy duty transport logistics on buses, trucks and trains. The antenna elements are protected by a tough ABS radome and is fixed to the vehicle with two robust mounting studs, which also provide a cable exit point from the antenna. The VHF element can be supplied pre-tuned or with on-site tuning capability across a pre-set bandwidth. Cabling and connector configuration options are available on the 403.10 including FAKRA automotive standard connectors.



### VHF/UHF Element

|                              |   |
|------------------------------|---|
| <b>Frequency range</b>       | <b>VHF</b> 138-220MHz (1-2MHz Tx bandwidth)<br><b>UHF</b> 380-470MHz (30MHz Tx bandwidth) |
| <b>Input impedance</b>       | 50Ω   |
| <b>VSWR</b>                  | <2.0:1  |
| <b>Maximum input power</b>   | 50 Watts  |
| <b>Polarisation</b>          | Vertical  |
| <b>Gain</b>                  | 1dBi  |
| <b>Grounding</b>             | Direct grounded   |
| <b>Ground plane required</b> | <b>VHF</b> typical 1.5m x 1.5m<br><b>UHF</b> typical 0.5m x 0.5m                          |

### UMTS/3G Element

|                              |              |
|------------------------------|--------------|
| <b>Frequency range</b>       | 1.9 - 2.2GHz |
| <b>Input impedance</b>       | 50Ω          |
| <b>VSWR</b>                  | <2.0:1       |
| <b>Maximum input power</b>   | 25 Watts     |
| <b>Polarisation</b>          | Vertical     |
| <b>Gain</b>                  | 2dBi         |
| <b>Ground plane required</b> | none         |

### GSM/GPRS Element

|                              |                             |
|------------------------------|-----------------------------|
| <b>Frequency range</b>       | 870 - 960MHz / 1710-1880MHz |
| <b>Input impedance</b>       | 50Ω                         |
| <b>VSWR</b>                  | <2.0:1                      |
| <b>Maximum input power</b>   | 25 Watts                    |
| <b>Polarisation</b>          | Vertical                    |
| <b>Gain</b>                  | 2dBi                        |
| <b>Ground plane required</b> | none                        |

### WLAN Element

|                              |                              |
|------------------------------|------------------------------|
| <b>Frequency range</b>       | 2.4 - 2.485GHz<br>5 - 5.9GHz |
| <b>Input impedance</b>       | 50Ω                          |
| <b>VSWR</b>                  | <2.0:1                       |
| <b>Maximum input power</b>   | 15 Watts                     |
| <b>Polarisation</b>          | Vertical                     |
| <b>Gain</b>                  | 2dBi                         |
| <b>Ground plane required</b> | none                         |

### GPS Element

|                            |               |
|----------------------------|---------------|
| <b>Frequency range</b>     | 1575.42MHz    |
| <b>Input impedance</b>     | 50 Ohms       |
| <b>VSWR</b>                | <2:1          |
| <b>Polarisation</b>        | RH Circular   |
| <b>Antenna gain</b>        | 3.0dbi        |
| <b>LNA gain</b>            | 28dB min.     |
| <b>Supply voltage</b>      | 3.0 - 5.5 vdc |
| <b>Current consumption</b> | 32mA max.     |
| <b>Noise figure</b>        | 1.6dB max.    |

### Mechanical Specifications

|                         |                                    |
|-------------------------|------------------------------------|
| <b>Connection</b>       | Cables / connector to requirements |
| <b>Dimensions</b>       | 958 x 144 x 62mm                   |
| <b>Mounting hole</b>    | 2 x 25mm holes, 858mm centres      |
| <b>Weight</b>           | 2kg approx                         |
| <b>Housing material</b> | ABS                                |
| <b>Other materials</b>  | Aluminium, PTFE, Brass, Nylon      |

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Colour</b>                      | Traffic White RAL9016              |
| <b>Operating temperature range</b> | -30°C to +70°C                     |
| <b>Storage temperature range</b>   | -50°C to +70°C                     |
| <b>Relative humidity</b>           | 5% to 95%RH                        |
| <b>Water resistance</b>            | to IP67 (external, when installed) |



This product is RoHS compliant

These antennas are omni directional, and suited for operation on vehicles in harsh environments. It operates simultaneously at both UHF and SHF bands. At UHF it operates as a quarter wave radiator, needing a conductive surface to operate correctly. At SHF, it is a full half wave radiator. The 452 is covered by a strong fibreglass radome. Three M10 bolts are required for installation.

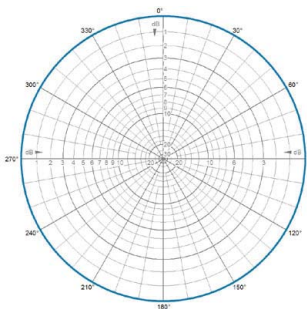
## Electrical & mechanical specifications



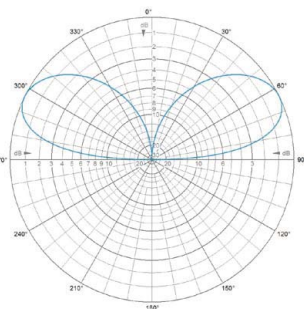
|                                       |  |
|---------------------------------------|--|
| <b>Frequency range</b>                | 450-470MHz<br>890-960MHz                 |
| <b>Input impedance</b>                | 50Ω                                      |
| <b>VSWR</b>                           | <1.6:1                                   |
| <b>Maximum input power</b>            | 250 Watts                                |
| <b>Polarisation</b>                   | Vertical                                 |
| <b>Forward gain</b>                   | 0 dBd                                    |
| <b>3 dB Beamwidth</b>                 | <b>E Plane</b> 80°                       |
|                                       |  |
| <b>Connection</b>                     | 'N' type socket                          |
| <b>Element</b>                        | Brass silver plated                      |
| <b>Radome</b>                         | Fibreglass moulding white                |
| <b>Mounting base</b>                  | Aluminium alloy                          |
| <b>Lightning / HT line protection</b> | Direct grounded                          |
| <b>Fixings</b>                        | Stainless steel M10 bolts (not supplied) |
| <b>Minimum ground plane</b>           | 500 mm x 500mm                           |
| <b>Typical weight</b>                 | 0.7 kg                                   |
| <b>Dimensions</b>                     | 170mm(h) x 100mm(dia)                    |
| <b>Typical wind loading @ 45m/s</b>   | 18 N                                     |

### Free space radiation patterns

**H-Plane**



**E-Plane**



### Mounting accessories

### Standard stock models

|                     |                          |
|---------------------|--------------------------|
| <b>Stock code</b>   | <b>Frequency</b>         |
| <b>452.01.05.00</b> | 450-470MHz<br>890-960MHz |



This product is RoHS compliant

These antennas are omni-directional and suited for operation on vehicles in harsh environments. Using a quarter wave radiator, they are short and very robust, and offer a wide operating bandwidth. They are d.c. grounded, and intended for installation on conductive surfaces. The radiator is an integral part of the base casting, giving an extremely strong antenna. The 472 is covered by a radome of tough moulded polyurethane.

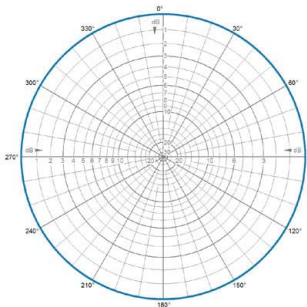
## Electrical & mechanical specifications



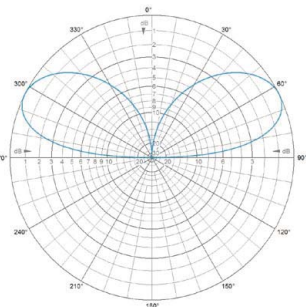
|                                       |   |
|---------------------------------------|---|
| <b>Frequency range</b>                | <b>472.01.05.00</b> 400 - 470 MHz         |
|                                       | <b>472.02.05.00</b> 380 - 450 MHz         |
| <b>Input impedance</b>                | 50Ω                                       |
| <b>VSWR</b>                           | <2.0:1                                    |
| <b>Maximum input power</b>            | 250 Watts                                 |
| <b>Polarisation</b>                   | Vertical                                  |
| <b>Forward gain</b>                   | 0 dBd                                     |
| <b>3 dB Beamwidth</b>                 | <b>E Plane</b> 80°                        |
|                                       |   |
| <b>Connection</b>                     | <b>472.0*.05.00</b> 'N' Type socket       |
|                                       | <b>472.0*.07.00</b> 'C' Type socket       |
|                                       | <b>472.0*.09.00</b> BNC Type socket       |
| <b>Element</b>                        | Diecast aluminium alloy LM25              |
| <b>Radome</b>                         | Polyurethane rotational moulding grey     |
| <b>Mounting flange</b>                | Diecast aluminium alloy LM25              |
| <b>Lightning / HT line protection</b> | Direct grounded                           |
| <b>Fixings</b>                        | 4 x M12 Bolts stainless steel grade A2-70 |
| <b>Recommended ground plane</b>       | 500 mm square minimum                     |
| <b>Typical weight</b>                 | 0.5kg                                     |
| <b>Dimensions</b>                     | 145 x 80 x 140                            |
| <b>Typical wind loading @ 45m/s</b>   | 18 N                                      |

### Free space radiation patterns

**H-Plane**



**E-Plane**



### Mounting accessories

### Standard stock models

| Stock code          | Frequency  |
|---------------------|------------|
| <b>472.01.05.00</b> | 400-470MHz |
| <b>472.02.05.00</b> | 380-450MHz |

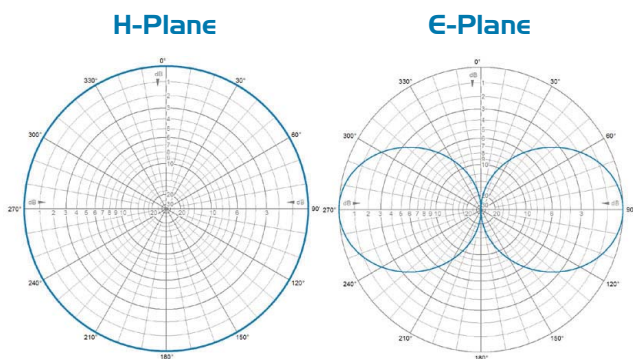
These antennæ are omni directional, and suited for operation on vehicles in harsh environments. They can also be used as a base station antenna using an adaptor plate. Using a full half wave radiator, they offer a wide operating bandwidth. They are d.c. grounded, and do not require a conductive surface (ground plane) for operation. The radiator is manufactured from ptfе dielectric printed circuit for high efficiency. The 4142 is covered by a radome of moulded fibreglass.

## Electrical & mechanical specifications



|                                       |  |
|---------------------------------------|--|
| <b>Frequency range</b>                | <b>4142.03</b> 850-960 MHz                   |
|                                       | <b>4142.04</b> 806-866 MHz                   |
| <b>Input impedance</b>                | 50Ω  |
| <b>VSWR</b>                           | <1.5:1                                       |
| <b>Maximum input power</b>            | 250 Watts                                    |
| <b>Polarisation</b>                   | Vertical                                     |
| <b>Forward gain</b>                   | 0 dBd  |
| <b>3 dB Beamwidth</b>                 | 80°  |
|                                       |  |
| <b>Connection</b>                     | 'N' Type socket                              |
| <b>Radiator</b>                       | PTFE dielectric printed circuit              |
| <b>Radome</b>                         | Fibreglass moulding white                    |
| <b>Mounting flange</b>                | Aluminium alloy                              |
| <b>Lightning / HT line protection</b> | Direct grounded                              |
| <b>Fixings</b>                        | 3 x Stainless steel M10 bolts (not supplied) |
| <b>Mast adaptor</b>                   | 2173.0000 & 290.01.00.00 (not supplied)      |
| <b>Typical weight</b>                 | 0.4 kg                                       |
| <b>Dimensions</b>                     | 170mm(h) x 100mm (dia)                       |
| <b>Typical wind loading @ 45m/s</b>   | 18 N   |

### Free space radiation patterns



### Mounting accessories



**2173**  
Aluminium mast adaptor.  
To suit 1 1/2" dia tube or  
290 adaptor



**290**  
Mast Bracket for use with  
2173 adaptor. To fit up to  
60mm dia tube

### Standard stock models

| Stock code     | Frequency  |
|----------------|------------|
| <b>4142.03</b> | 850-960MHz |
| <b>4142.04</b> | 806-890MHz |

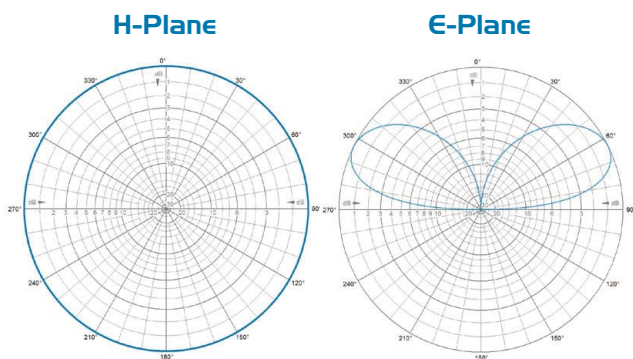
The 4142 antenna offers a solution where Global Positioning Satellite systems are used with GSM, and the environment demands a rugged antenna. They are very short and robust, and protected by a radome of tough moulded polyurethane. The GSM antenna incorporates a DC short and the GPS antenna is fully sealed to protect against overhead power cables. A 26dB gain low noise amplifier is incorporated in the GPS antenna to overcome losses in large cable lengths.

### Electrical & mechanical specifications



|                                       |  |
|---------------------------------------|--|
| <b>Frequency range</b>                | <b>4142.09.11.00</b> 870-960MHz                    |
|                                       | <b>4142.07.11.00</b> 806-870MHz                    |
|                                       | <b>GPS</b> 1574.42-1576.42MHz                      |
| <b>Input impedance</b>                | 50Ω  |
| <b>VSWR</b>                           | <1.5:1   |
| <b>LNA gain (GPS)</b>                 | 26dB   |
| <b>Supply voltage (GPS)</b>           | 3.3 - 5V   |
| <b>Noise factor (GPS)</b>             | <5.5dB   |
| <b>Polarisation</b>                   | <b>GSM</b> Vertical <b>GPS</b> Right Hand Circular |
| <b>Forward gain (GSM)</b>             | 0dBd   |
| <b>Maximum input power (GSM)</b>      | 150W   |
| <b>3 dB Beamwidth (GSM)</b>           | <b>E-Plane</b> 80°                                 |
| <b>Connection</b>                     | Terminated to requirements                         |
| <b>Radiator (GSM)</b>                 | PTFE Printed circuit                               |
| <b>Antenna base</b>                   | Aluminium alloy alocrom 1000                       |
| <b>Radome</b>                         | Polyurethane rotational moulding grey              |
| <b>Lightning / HT line protection</b> | <b>GSM</b> Direct grounded                         |
| <b>Fixings</b>                        | 4 x M12 Bolts stainless steel grade A2-70          |
| <b>Typical weight</b>                 | 0.5kg  |
| <b>Dimensions</b>                     | 145 x 80 x 140mm                                   |
| <b>Typical wind loading @ 45m/s</b>   | 18 N   |

#### Free space radiation patterns



#### Mounting accessories

#### Standard stock models

| Stock code           | Frequency  |
|----------------------|------------|
| <b>4142.09.11.00</b> | 870-960MHz |
| <b>4142.09.11.00</b> | 806-870MHz |

These antennæ are omni directional, and suited for operation on vehicles in harsh environments. Using a full half wave radiator, they offer a wide operating bandwidth. They are d.c. grounded, and do not require a conductive surface (ground plane) for operation. The radiator is manufactured from PTFE dielectric printed circuit for high efficiency. The 4172 is covered by a radome of tough moulded polyurethane.

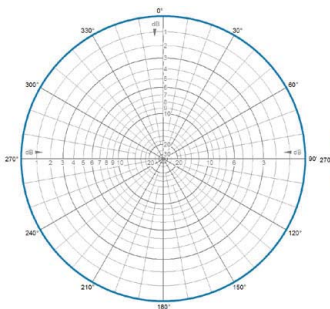
## Electrical & mechanical specifications



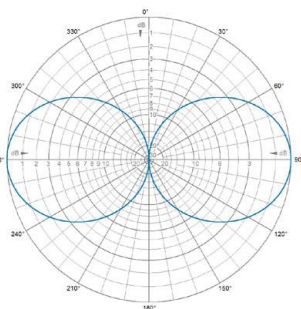
|                                       |   |
|---------------------------------------|---|
| <b>Frequency range</b>                | 870-960MHz                                |
| <b>Input impedance</b>                | 50Ω                                       |
| <b>VSWR</b>                           | <1.5:1                                    |
| <b>Maximum input power</b>            | 250 Watts                                 |
| <b>Polarisation</b>                   | Vertical                                  |
| <b>Forward gain</b>                   | 0 dBd                                     |
| <b>3 dB Beamwidth</b>                 | <b>E Plane</b> 80°                        |
|                                       |   |
| <b>Connection</b>                     | 'N' type socket                           |
| <b>Radiator</b>                       | PTFE dielectric printed circuit           |
| <b>Radome</b>                         | Polyurethane rotational moulding grey     |
| <b>Mounting flange</b>                | Diecast aluminium alloy LM25              |
| <b>Lightning / HT line protection</b> | Direct grounded                           |
| <b>Fixings</b>                        | 4 x M12 Bolts stainless steel grade A2-70 |
| <b>Typical weight</b>                 | 0.5kg                                     |
| <b>Dimensions</b>                     | 145 x 80 x 140mm                          |
| <b>Typical wind loading @ 45m/s</b>   | 18 N                                      |

### Free space radiation patterns

**H-Plane**



**E-Plane**



### Mounting accessories

### Standard stock models

|                   |                  |
|-------------------|------------------|
| <b>Stock code</b> | <b>Frequency</b> |
| 4172.01.05.00     | 870-960MHz       |