



52432486 - Antennas

About This Chapter

The microwave device uses the parabolic antennas to transmit and receive electromagnetic waves. The antennas described in this document are the parabolic antennas adaptive to the RTN XMC ODUs.

Parabolic Microwave ANT,A18D06MS-3NX,18G,600mm,UHP-M,Dual Polarization,Separate Mount,39.4dBi,1.8deg,30dB

6.1 Device Type

Antennas are classified into two types, namely, the single-polarized antenna and dual-polarized antenna.

6.2 Functions

The microwave antenna is used to convert between the RF signals transmitted from the ODU and electromagnetic waves radiated in the air.

6.3 Working Principles

The antenna consists of the reflector, feed boom, radome, shield, and mounting bracket.

6.4 Interfaces

The feed boom interface of the single-polarized antenna in direct mounting mode is a waveguide interface. The feed boom interfaces of the single-polarized antenna in separate mounting mode and of the dual-polarized antenna are flange interfaces.

6.5 Antenna Diameters

The antenna diameters vary according to the antenna type and the frequency band where the antenna operates.

6.6 Technical Specifications

The technical specifications of the antenna include the electrical indexes and mechanical indexes. The electrical indexes of the antenna include the antenna gain, half-power beamwidth, VSWR, and front-to-back ratio. The mechanical indexes of the antenna include the size, weight, wind-protective feature, and ice/snow-protective feature.

6.1 Device Type

Antennas are classified into two types, namely, the single-polarized antenna and dual-polarized antenna.

- The single-polarized antenna transmits or receives electromagnetic waves in a specific polarization direction. The single-polarized antenna provides a feed boom interface. The feed boom interface can be set to be vertically polarized or horizontally polarized.

According to the mode of installing the ODU on the antenna, the single-polarized antenna is classified into two types, namely, the direct mounting mode and separate mounting mode. The single-polarized antenna with the diameter less than or equal to 1.8 m supports the direct mounting mode and separate mounting mode. The single-polarized antenna with the diameter greater than 1.8 m supports the separate mounting mode.

Figure 6-1 and **Figure 6-2** show the feed booms of the single-polarized antennas.

Figure 6-1 Feed boom of the single-polarized antenna with the diameter less than or equal to 1.8 m



Figure 6-2 Feed boom of the single-polarized antenna with the diameter greater than 1.8 m



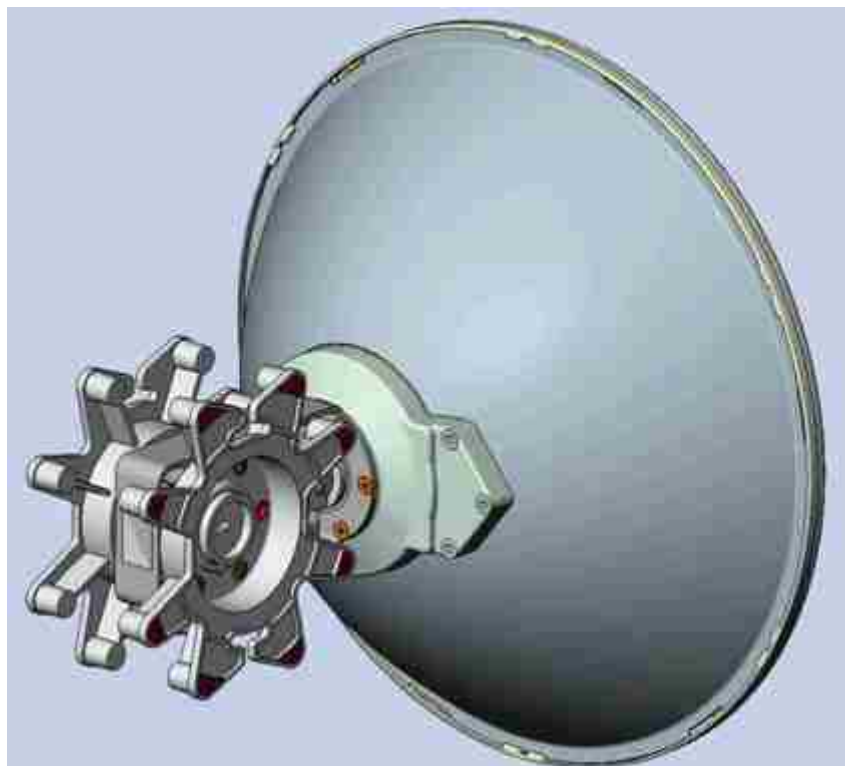
- The dual-polarized antenna transmits and receives horizontally-polarized and vertically-polarized electromagnetic waves at the same time. According to the mode of installing the ODU to the antenna, the dual-polarized antenna is classified into two types, namely, direct-mount antenna and separate-mount antenna.

Figure 6-3 and **Figure 6-4** show the feed booms of the separate-mount dual-polarized antenna and the direct-mount dual-polarized antenna.

Figure 6-3 Feed boom of the separate-mount dual-polarized antenna



Figure 6-4 Feed boom of the direct-mount dual-polarized antenna



- The UHP S2D antenna is a multi-function antenna. It has the following functions:
 - A single-polarized antenna is used by default, which can be transformed to a dual-polarized antenna installed in direct-mounting mode.
 - If a single-polarized antenna is transformed to a dual-polarized antenna, the OMT or dual-polarized combiner can be used to allow multiple ODUs to be installed in direct-mounting mode. In this way, the configuration of **XPIC/1+1** or **ACAP/CCDP 4+0** can be achieved.

6.2 Functions

The microwave antenna is used to convert between the RF signals transmitted from the ODU and electromagnetic waves radiated in the air.

- In the TX direction, the antenna converts the RF signals transmitted from the ODU into directional electromagnetic waves and then radiates electromagnetic waves in the air.
- In the RX direction, the antenna receives and assembles electromagnetic waves from the air, converts electromagnetic waves into the RF signals, and then transmits the RF signals to the ODU.

6.3 Working Principles

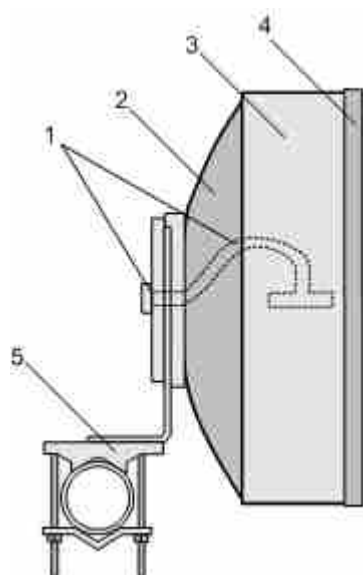
The antenna consists of the reflector, feed boom, radome, shield, and mounting bracket.

Figure 6-5 shows the structure of the antenna.

 NOTE

This section takes the single-polarized antenna as an example to describe the working principles of antennas. The dual-polarized antenna has two feed boom interfaces and thus can transmit and receive electromagnetic waves in the vertical and horizontal polarization directions at the same time. The working principles of each component of the dual-polarized antenna are similar to the working principles of each component of the single-polarized antenna.

Figure 6-5 Structure of the antenna



- | | | |
|--------------|---------------------|-----------|
| 1. Feed boom | 2. Reflector | 3. Shield |
| 4. Radome | 5. Mounting bracket | |

The functions of each component of the antenna are described as follows:

- **Feed boom**

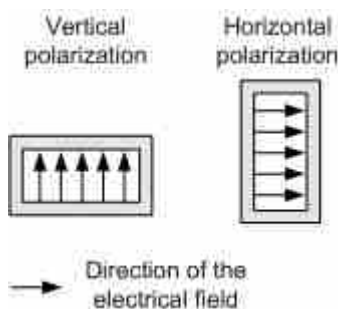
The input interface of the feed boom receives the RF signals transmitted from the ODU. The received RF signals are transmitted through the waveguide to the output interface of the feed boom, which is located at the focal spot of the reflector. The output interface of the feed boom is equivalent to a preliminary horn antenna. It radiates electromagnetic waves towards the antenna reflector.

You can change the polarization direction of the antenna by rotating the feed boom. The polarization direction of the antenna is the polarization of electromagnetic waves radiated by the antenna. The polarization direction of electromagnetic waves is the direction of the electrical field. [Figure 6-6](#) shows the polarization directions supported by the rectangular waveguide.

 NOTE

The polarization direction of the antenna must be the same as the polarization direction of the ODU or hybrid coupler. The feed booms of certain types use the round waveguide. In this case, see installation instructions of the antenna to adjust the polarization direction of the antenna according to the polarization identifier.

Figure 6-6 Polarization directions supported by the rectangular waveguide



- Reflector
Normally, the reflector of the microwave antenna is a rotatable paraboloid. The reflector is mainly used for reflecting electromagnetic waves and providing the directive gain.
 - In the TX direction, the reflector reflects electromagnetic waves radiated from the feed boom so that electromagnetic waves are directional.
 - In the RX direction, the reflector reflects electromagnetic waves received from a wider space, and then assembles electromagnetic waves to the output interface of the feed boom.
- Radome
The radome protects the antenna from damages caused by the wind, rain, and ice. Electromagnetic waves can be radiated through the radome.
- Shield
The shield is installed on the HP antenna. The shield is mainly used for suppressing the radiation of the side lobes.
- Mounting bracket
The mounting bracket is used for fixing the antenna onto the pole and for adjusting the azimuth and elevation slightly. In addition to the mounting bracket, a reinforcing rod is required for fixing the antenna with a larger diameter. For details, see the instructions for the antenna.

6.4 Interfaces

The feed boom interface of the single-polarized antenna in direct mounting mode is a waveguide interface. The feed boom interfaces of the single-polarized antenna in separate mounting mode and of the dual-polarized antenna are flange interfaces.

Table 6-1 lists the specifications for the feed boom interface of the antenna adaptive to the XMC ODU.

Table 6-1 Specifications for the feed boom interface of an antenna

Frequency Band	Interface Type			
	Direct-Mount Single-Polarized Antenna	Direct-Mount Dual-Polarized Antenna	Separate-mount Single-Polarized Antenna	Separate-mount Dual-Polarized Antenna
6 GHz	153IEC-R70, can be interconnected with the PDR70	153IEC-R70	154IEC-PDR70	154IEC-PDR70
7/8 GHz	153IEC-R84, can be interconnected with the PBR84	153IEC-R84	154IEC-UBR84	154IEC-UBR84
10/11 GHz	153IEC-R100, can be interconnected with the PBR100	153IEC-R100	154IEC-UBR100	154IEC-UBR100
13 GHz	153IEC-R120, can be interconnected with the PBR120	153IEC-R120	154IEC-UBR120	154IEC-UBR120
15 GHz	153IEC-R140, can be interconnected with the PBR140	153IEC-R140	NA	154IEC-UBR140
18/23/26 GHz	153IEC-R220, can be interconnected with the PBR220	153IEC-R220	NA	154IEC-UBR220
28/32/38 GHz	154IEC-R320, can be interconnected with the PBR320	153IEC-R320	NA	154IEC-UBR320
42 GHz	UG 383/U-R400, can be interconnected with the UG 383/U-R400	UG383	NA	UG383

6.5 Antenna Diameters

The antenna diameters vary according to the antenna type and the frequency band where the antenna operates.

Table 6-2 and **Table 6-3** list the diameters supported by different types of antennas. "Y" indicates that the corresponding antenna diameter is supported. "NA" indicates that the corresponding antenna diameter is not supported.

Table 6-2 Diameter of the single-polarized antenna

Frequency Band	Antenna Diameter									
	0.2 m	0.3 m	0.6 m	0.9 m	1.0 m	1.2 m	1.8 m	2.4 m	3.0 m	3.7 m
6 GHz	NA	NA	NA	Y	Y	Y	Y	Y	Y	Y
7/8 GHz	NA	NA	Y	Y	Y	Y	Y	Y	Y	Y
10/11GHz	NA	Y	Y	Y	Y	Y	Y	NA	NA	NA
13 GHz	NA	Y	Y	Y	Y	Y	Y	Y	Y	NA
15 GHz	NA	Y	Y	Y	Y	Y	Y	NA	NA	NA
18 GHz	NA	Y	Y	Y	Y	Y	Y	NA	NA	NA
23 GHz	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA
26 GHz	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA
28 GHz	NA	Y	Y	NA	NA	NA	NA	NA	NA	NA
32 GHz	NA	Y	Y	NA	NA	NA	NA	NA	NA	NA
38 GHz	Y	Y	Y	NA	NA	NA	NA	NA	NA	NA
42 GHz	NA	Y	Y	NA	NA	NA	NA	NA	NA	NA

Table 6-3 Diameter of the separate-mount dual-polarized antenna

Frequency Band	Antenna Diameter								
	0.3 m	0.6 m	0.9 m	1.0 m	1.2 m	1.8 m	2.4 m	3.0 m	3.7 m
6 GHz	NA	NA	NA	Y	Y	Y	Y	Y	Y
7/8 GHz	NA	Y	Y	Y	Y	Y	Y	Y	Y
10GHz	NA	Y	Y	Y	Y	Y	NA	NA	NA
11GHz	NA	Y	Y	Y	Y	Y	Y	Y	NA
13 GHz	NA	Y	Y	NA	Y	Y	Y	Y	Y
15 GHz	NA	Y	Y	NA	Y	Y	NA	NA	NA
18 GHz	NA	Y	Y	NA	Y	Y	NA	NA	NA
23 GHz	NA	Y	Y	NA	Y	Y	NA	NA	NA
26 GHz	Y	Y	Y	NA	Y	NA	NA	NA	NA
28 GHz	Y	Y	NA	NA	NA	NA	NA	NA	NA

Frequency Band	Antenna Diameter								
	0.3 m	0.6 m	0.9 m	1.0 m	1.2 m	1.8 m	2.4 m	3.0 m	3.7 m
32 GHz	Y	Y	NA	NA	NA	NA	NA	NA	NA
38 GHz	Y	Y	NA	NA	NA	NA	NA	NA	NA
42 GHz	Y	Y	NA	NA	NA	NA	NA	NA	NA

Table 6-4 Diameter of the direct-mount dual-polarized antenna

Frequency Band	Antenna Diameter					
	0.3 m	0.6 m	0.9 m	1 m	1.2 m	1.8 m
6 GHz	NA	NA	NA	NA	NA	NA
7/8 GHz	NA	Y	Y	Y	Y	Y
10GHz	NA	Y	Y	Y	Y	Y
11GHz	NA	Y	Y	Y	Y	Y
13 GHz	Y	Y	Y	Y	Y	Y
15 GHz	Y	Y	Y	Y	Y	Y
18 GHz	Y	Y	Y	Y	Y	Y
23 GHz	Y	Y	Y	Y	Y	Y
26 GHz	Y	Y	Y	Y	Y	NA
28 GHz	Y	Y	NA	NA	NA	NA
32 GHz	Y	Y	NA	NA	NA	NA
38 GHz	Y	Y	NA	NA	NA	NA
42 GHz	NA	NA	NA	NA	NA	NA

6.6 Technical Specifications

The technical specifications of the antenna include the electrical indexes and mechanical indexes. The electrical indexes of the antenna include the antenna gain, half-power beamwidth, VSWR, and front-to-back ratio. The mechanical indexes of the antenna include the size, weight, wind-protective feature, and ice/snow-protective feature.

Huawei provides a complete series of antennas. To obtain the technical documents about the specifications of a specific antenna, contact Huawei.

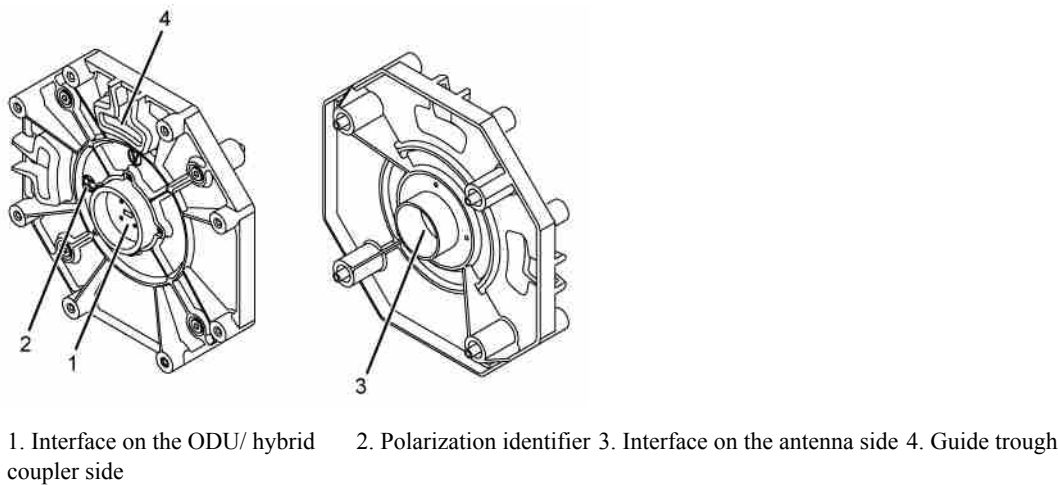
7 Antenna Adapter

This describes the antenna adapter. In direct mounting mode, the antenna adapter is used for transfer if the antenna does not adaptive to the RTN XMC ODU.

Appearance and Interfaces

Figure 7-1 shows the appearance and interfaces of the antenna adapter.

Figure 7-1 Appearance and interfaces of the antenna adapter



Technical Specifications

Table 7-1 lists the technical specifications of the antenna adapter.

Table 7-1 Technical specifications of the antenna adapter

Item	Specification
Loss	≤ 0.2 dB (7/8/10/11/13/15/18/23/26/28/32/38/42 GHz frequency band)

Item		Specification
Voltage Standing Wave Ratio (VSWR)		≤ 1.3 (7/8/10/11/13/15/18/23/26/28/32/38/42 GHz frequency band)
Interfaces	Antenna side	1.025 inch dia circular (7/8 GHz frequency band) 153IEC-R100 (10/11 GHz frequency band) 153IEC-R120 (13 GHz frequency band) 153IEC-R140 (15 GHz frequency band) 153IEC-R220 (18/23/26 GHz frequency band) 153IEC-R320 (28/32 GHz frequency band) 0.219 inch dia Circular (38 GHz frequency band) UG 383/U-R400 (42 GHz frequency band)
	ODU/hybrid coupler side	153IEC-R84, can be interconnected with the PBR84 (7/8 GHz frequency band) 153IEC-R100, can be interconnected with the PBR100 (10/11 GHz frequency band) 153IEC-R120, can be interconnected with the PBR120 (13 GHz frequency band) 153IEC-R140, can be interconnected with the PBR140 (15 GHz frequency band) 153IEC-R220, can be interconnected with the PBR220 (18/23/26 GHz frequency band) 153IEC-R320, can be interconnected with the PBR320 (28/32/38 GHz frequency band) UG 383/U-R400, can be interconnected with the UG 383/U-R400 (42 GHz frequency band)
Weight		≤ 2.5 kg

Labels

The following labels are attached to the antenna adapter: nameplate label, and bar code. These labels are used to identify the basic information of the antenna adapter.

- Nameplate Label

Figure 7-2 shows the nameplate label of the antenna adapter.

Figure 7-2 Nameplate label of the antenna adapter



Table 7-2 describes the meanings of the parameters on the nameplate label.

Table 7-2 Meanings of the parameters on the nameplate label

Label Information	Content of the Label	Parameter	Meaning
Antenna adapter name	15G Antenna adapter ① ②	①: Frequency band	Working frequency of the antenna adapter: 7/8/10/11/13/15/18/23/26/32/38/42 (GHz)
		②: Component name	Indicates that the component is an antenna adapter
Antenna adapter code (ITEM)	21211379	-	Used to identify the type of the antenna adapter

● Bar Code

Table 7-3 shows the bar code of the antenna adapter and describes the meanings of the label.

Table 7-3 Bar code

Name	Appearance	Meaning
Bar code		Bar code of the antenna adapter serial number, which is used to uniquely identify each antenna adapter