

RTN XMC ODU

Hardware Description

HUAWEI TECHNOLOGIES CO., LTD.



Copyright © Huawei Technologies Co., Ltd. 2013. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Technologies Co., Ltd.

Trademarks and Permissions



HUAWEI and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: <http://www.huawei.com>

Email: support@huawei.com

About This Document

Overview

This document describes the RTN XMC ODU and related devices, which consist of the hybrid coupler, separate mounting components, antennas, antenna adapter, and cables.

Organization

This document is organized as follows.

1 Outdoor Unit (ODU)

The ODU is an outdoor unit of the digital microwave system. It is used to convert and amplify signals. The ODUs that are described in this document are the RTN XMC ODUs.

2 Hybrid coupler

Hybrid coupler is short for the RF signal combiner/divider. It is used to install two ODUs on one antenna. The hybrid couplers that are described in this document are the hybrid couplers adaptive to the RTN XMC ODUs.

3 Separate Mounting Components

The separate mounting components consist of the ODU separate mounting bracket and flexible waveguide. The separate mounting components described in this document are the separate mounting components adaptive to the RTN XMC ODUs.


4 Cables





This describes the cables of the ODU. The cables of the ODU which consist of the IF cable and ODU PGND cable.

Conventions

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	Indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.

Symbol	Description
 WARNING	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
 CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
 TIP	Indicates a tip that may help you solve a problem or save time.
 NOTE	Provides additional information to emphasize or supplement important points of the main text.

General Conventions

The general conventions that may be found in this document are defined as follows.

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in boldface . For example, log in as user root .
<i>Italic</i>	Book titles are in <i>italics</i> .
Courier New	Examples of information displayed on the screen are in Courier New.

Command Conventions

The command conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	The keywords of a command line are in boldface .
<i>Italic</i>	Command arguments are in <i>italics</i> .
[]	Items (keywords or arguments) in brackets [] are optional.
{ x y ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x y ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x y ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.

Convention	Description
[x y ...]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

GUI Conventions

The GUI conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in boldface . For example, click OK .
>	Multi-level menus are in boldface and separated by the ">" signs. For example, choose File > Create > Folder .

Keyboard Operations

The keyboard operations that may be found in this document are defined as follows.

Format	Description
Key	Press the key. For example, press Enter and press Tab .
Key 1+Key 2	Press the keys concurrently. For example, pressing Ctrl+Alt+A means the three keys should be pressed concurrently.
Key 1, Key 2	Press the keys in turn. For example, pressing Alt, A means the two keys should be pressed in turn.

Mouse Operations

The mouse operations that may be found in this document are defined as follows.

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

1 Outdoor Unit (ODU)

1.1 Device Type

This describes the types of the ODU. The XMC-1 ODU is a type of low capacity for ODU. The XMC-2 ODU is a type of ODU in high power.

Table 1-1 shows the performance and attributes of the ODU.

Table 1-1 Performance attributes of the ODU

Item	XMC-2 ODU
ODU type	ODU in high power
Frequency band	6 GHz, 7 GHz, 8 GHz, 10GHz, 11GHz, 13 GHz, 15 GHz, 18 GHz, 23GHz, 26 GHz, 28 GHz, 32 GHz, 38GHz, and 42 GHz
Microwave modulation format	QPSK, QPSKStrong, 16QAM, 16QAMStrong, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 512QAMLight, 1024QAM, 1024QAMLight
Channel spacing	7 MHz, 14 MHz, 28 MHz, 40 MHz, and 56 MHz

1.2 Appearance

The ODU is an outdoor integrated device that adopts the unified design.

Figure 1-1 shows the appearance of the ODU.

Figure 1-1 Appearance of the ODU

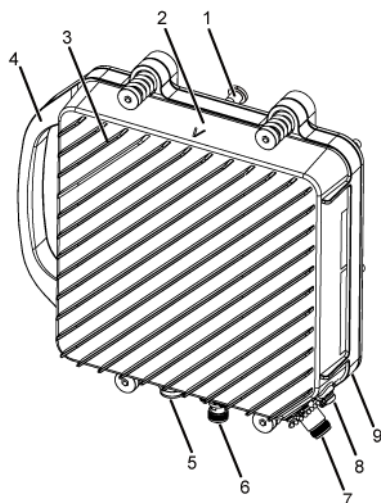


Table 1-2 describes the appearance of the ODU.

Table 1-2 Appearance description of the ODU

Serial No.	Item	Description
1	Hook	The hook is used together with the hook trough to facilitate the installation of the ODU.
2	Polarization direction identifier	H: Horizontal polarization V: Vertical polarization
3	Cooling fins	The 45° slant angle of the cooling fins ensures the ventilation of the ODU in horizontal-polarized and vertical-polarized conditions to facilitate heat dissipation.
4	Handle	The handle is used to facilitate the holding and installation of the ODU.
5	Pressure vent	Ensures that the pressure inside the ODU and that outside the ODU are the same, thus preventing explosion. In addition, the pressure vent valve can prevent moisture.
6	RSSI interface	See Interfaces on the ODU .
7	IF interface	
8	Grounding screw	
9	Cut corner	In horizontal and vertical conditions, cables are inclined from the cut corner to enhance waterproof reliability.

1.3 Functions

The ODU, a microwave RF unit, has the function of frequency conversion and power amplification. The ODU determines microwave frequencies of the transmitted and received signals and is not affected by transmission service types such as the TDM Service and Ethernet service.

The ODU supports the following features:

- Various channel spacing.
- Various modulation formats.
- Adaptive modulation (AM) function.
- Adjustment of TX/RX frequencies through software.
- Adjustment of TX power through software.
- Temperature detection.
- TX power detection.
- RX power detection.
- Received Signal Strength Indicator (RSSI) interface:

The ODU has an RSSI interface, which indicates the RX power in voltage.

- Mute transmission.
- Automatic Gain Control (AGC) function of received signals:

The ODU automatically adjusts the channel gain according to the level of received signals.

1.4 Installation Mode

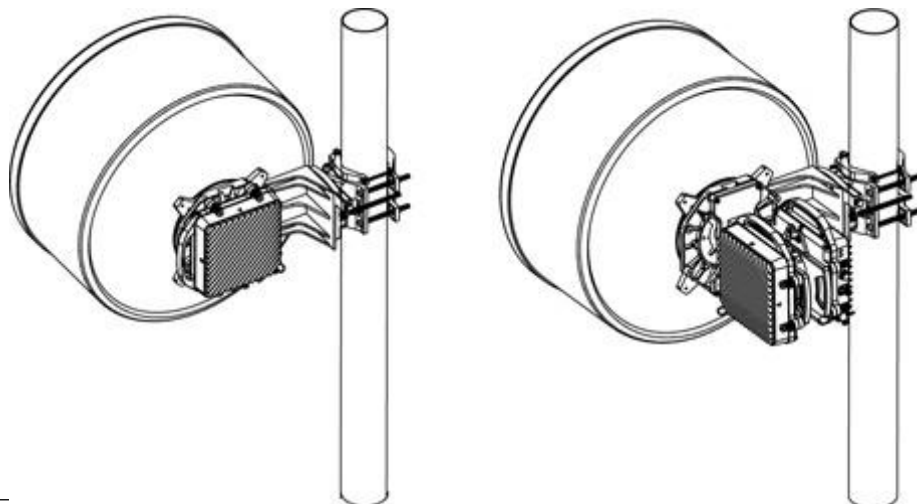
The ODU can be installed on the antenna in two modes: direct mounting mode and separate mounting mode.

Direct Mounting Mode

When the small-diameter and single-polarized antenna is used, the direct mounting mode is usually adopted. In this case, if one ODU uses one antenna, the ODU should be installed at the back of the antenna. If two ODUs share one antenna, one RF signal combiner-divider (hereinafter referred to as hybrid coupler) should be added between the antenna and the ODU.

Figure 1-3 shows the direct mounting mode.

Figure 1-3 Direct mounting mode



Separate Mounting Mode

When the dual-polarized antenna or the large-diameter and single-polarized antenna is used, the separate mounting mode is adopted. In this case, two ODUs can share one feed boom by adding a hybrid coupler.

In separate mounting mode, the ODU separated mounting bracket is used to fix the ODU or hybrid coupler on the pole. The ODU or hybrid coupler and the antenna are connected through a flexible wave guide.

Figure 1-4 shows the separate mounting mode using a single-polarized antenna.

Figure 1-4 Separate mounting mode using a single-polarized antenna

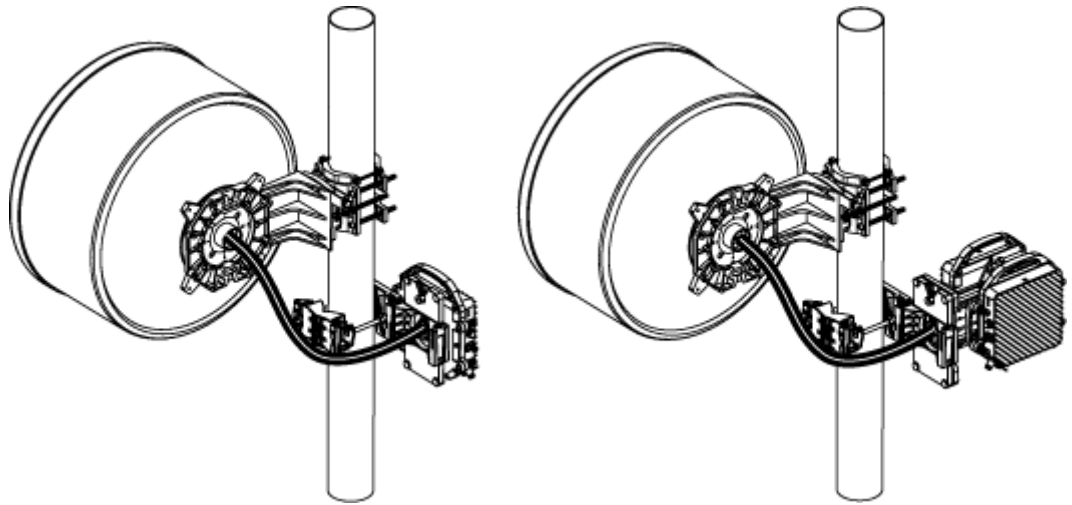
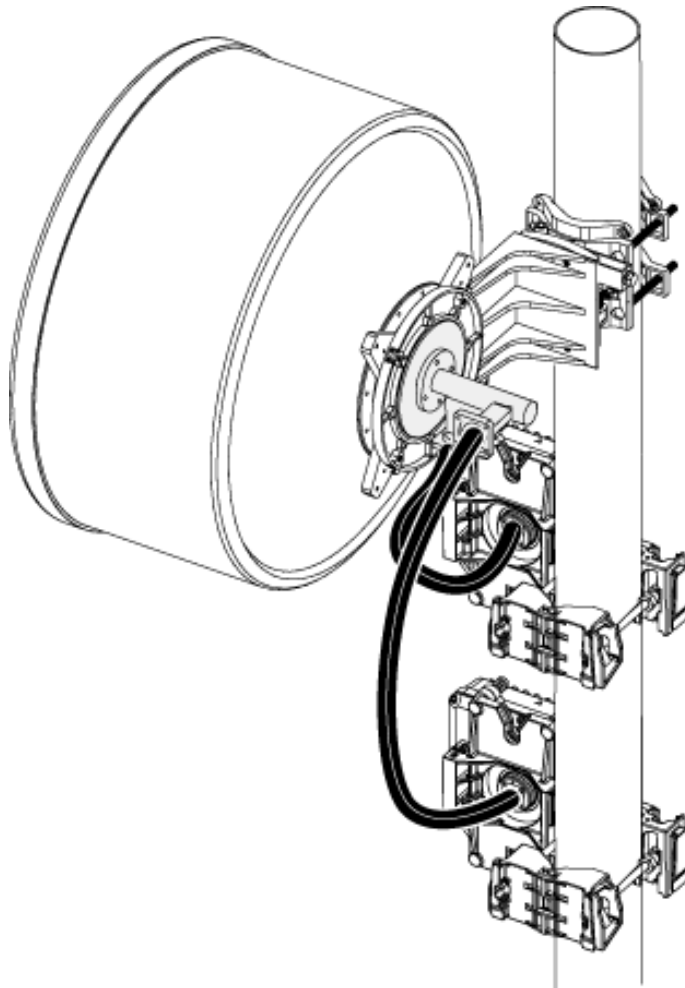


Figure 1-5 shows the separate mounting mode using a dual-polarized antenna.

Figure 1-5 Separate mounting mode using a dual-polarized antenna



1.5 Interfaces

The interfaces of the ODU consist of the antenna interface, IF interface, RSSI interface, and grounding screw.

Figure 1-6 shows the interfaces of the ODU.

Figure 1-6 Interfaces of the ODU

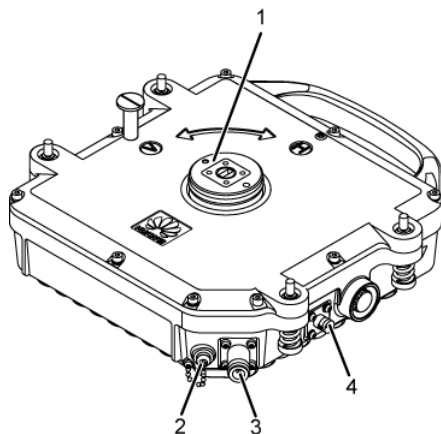


Table 1-3 describes the interfaces of the ODU.

Table 1-3 Interfaces of the ODU

Serial No.	Interface Name	Interface Type	Description
1	Antenna interface	153IEC-R70, can be interconnected with the PDR70 (6 GHz frequency band) 153IEC-R84, can be interconnected with the PBR84 (7/8 GHz frequency band)	The antenna interface is a waveguide interface that is connected to an antenna, a hybrid coupler, an antenna adapter, or a flexible waveguide.
2	Grounding screw	M5 screw	The grounding screw is connected to the PGND cable .
3	IF interface	N type (female)	The IF interface is connected to the IDU through an IF cable .
4	RSSI interface	BNC type (female)	The received signal strength of the ODU can be calculated based on the voltage of the interface that is measured through a multimeter.

1.6 Labels

The following labels are attached to the ODU: nameplate label, bar code, radiation label, and overtemperature label. These labels are used to identify the device information, radiation alarm, and overtemperature alarm of the ODU.

The ODU labels and the meanings of the labels are describes as follows:

- Nameplate Label

Figure 1-7 shows the nameplate label of the ODU.

Figure 1-7 Nameplate label of the ODU



Table 1-4 describes the meanings of the parameters on the nameplate label.

Table 1-4 Meanings of the parameters on the nameplate label

Label Information	Content of the Label	Parameter	Meaning
ODU name	RTN XMC 7G-2 ① ② OUTDOOR UNIT ③	①: Frequency band	Working frequency of the ODU (GHz)
		②: ODU type	1: Low capacity for ODU 2: ODU in high power
		③: Component name	Indicates that the component is an ODU
ODU code (ITEM)	52412511	-	Used to identify the type of the ODU
ODU T/R spacing (T/R SPACING)	154MHz	-	Spacing between RX and TX frequencies (MHz)

Label Information	Content of the Label	Parameter	Meaning
ODU subband (SUB BAND)	A	-	Frequency subbands numbered with letters
TX status information about the ODU (TX)	Hi, 7582-7638MHz ① ②	①: TX high/low station	Hi: TX high station Lo: TX low station
		②: Range of the TX frequency	Range of the ODU TX frequency (MHz)
CMIIT ID	-	-	ID of Radio Transmission Equipment Type Approval Certificate (domestic)

1.7 Technical Specifications

The technical specifications of the ODU consist of working formats, frequency bands, transceiver specifications, IF specifications, integrated system specifications, and frequency information.

1.7.1 XMC-2 ODU

This describes the technical specifications of the XMC-2 ODU.

Working Formats

Table 1-18 lists the modulation format and the channel spacing of the ODU.

Table 1-18 Working formats of the ODU (XMC-2 ODU)

Item	Specification
Modulation format	QPSK, QPSKStrong, 16QAM, 16QAMStrong, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 512QAMLight, 1024QAM and 1024QAMLight
Channel spacing	7 MHz, 14 MHz, 28 MHz, 40 MHz, and 56 MHz

Table 1-21 Transceiver specifications of the ODU (XMC-2 ODU, IS3)

Frequency Bands

Table 1-19 lists the working frequency bands of the ODU.

Table 1-19 Working frequency bands of the ODU (XMC-2 ODU)

Frequency Band	Frequency Range (GHz)	Interval Between Center RX and TX Frequencies in a Channel (MHz)
6 GHz	From 5.925 to 7.125	252.04, 160/170, and 340/350
7 GHz	From 7.093 to 7.897	154, 161, 168, 196, and 245

Transceiver Specifications

Table 1-20 and **Table 1-21** list the transceiver specifications of the ODU.

Table 1-20 Transceiver specifications of the ODU (XMC-2 ODU,IS2/IF2)

Item	Specification					
	QPSK	16QAM	32QAM	64QAM	128QAM	256QAM
Rated maximum TX power(dBm)						
6GHz	30dBm	28dBm	26.5dBm	25dBm	25dBm	23dBm
7GHz	26.5dBm	25.5dBm	25.5dBm	25dBm	25dBm	23dBm
Rated minimum TX power(dBm)						
6 GHz	0 dBm					
7 GHz	6.5 dBm					

Item	Specification							
	QPSK/ QPSK Stong	16QA M/ 16QA MStro ng	32QA M	64QA M	128QA M	256QA M	512QA M/ 512QA MLigh t	1024Q AM/ 1024Q AMLi ght
Rated maximum TX power(dBm)								
6GH z	30dBm	28dBm	26.5dB m	25dBm	25dBm	23dBm	21dBm	19dBm
7GH z	26.5dB m	25.5dB m	25.5dB m	25dBm	25dBm	23dBm	—	—

Item	Specification							
	QPSK/ QPSK Stong	16QA M/ 16QA MStro ng	32QA M	64QA M	128QA M	256QA M	512QA M/ 512QA MLigh t	1024Q AM/ 1024Q AMLi ght
Rated minimum TX power(dBm)								
6 GHz	0 dBm							
7 GHz	6.5 dBm						-	

Item	Specificatio							
	QPSK/ QPSK Stong	16QA M/ 16QA MStron g	32Q A M	64Q A M	128QA M	256QA M	512QA M/ 512QA MLigh t	1024Q AM/ 1024Q AMLi ght
Maxi mum RF RX power	6/7/8/10/10.5/11/13/15/18/23/26/28/32/38 GHz QPSK/16QAM/32QAM/64QAM/128QAM/256QAM: - 20 dBm						-25dBm	
Freque ncy stabil ity	$\leq \pm 5$ ppm							

IF Specifications

Table 1-22 lists the IF specifications of the ODU.

Table 1-22 IF specifications of the ODU (XMC-2 ODU)

Item		Specification
IF signal	Center frequency of the input IF	350 MHz
	Center frequency of the RX IF	140 MHz
	Return loss of the IF interface	< -15 dB
ODU O&M signal	Modulation mode	ASK
	Uplink signal	5.5 MHz
	Downlink signal	10 MHz

Integrated System Specifications

Table 1-23 lists the integrated system specifications of the ODU.

Table 1-23 Integrated system specifications of the ODU (XMC-2 ODU)

Item	Specification
Integrated system dimensions	228 mm x 228 mm x 75 mm (width x depth x height)
Weight	≤ 4.5 kg
Power supply	-48 V (from -32 V to -72 V) DC
Power consumption	≤ 35 W (6 GHz frequency band) ≤ 33 W (7/8 GHz frequency band)

Frequency Information

Table 1-24 lists the information about the 6 GHz frequency band.

Table 1-24 Information about the 6 GHz frequency band (XMC-2 ODU)

T/R Spacing (MHz)	Sub-Band	Lower Sub-band TX Frequency (MHz)		Higher Sub-band TX Frequency (MHz)	
		Lower Limit	Upper Limit	Lower Limit	Upper Limit
252.04	A	5,925.00	6,025.00	6,175.00	6,275.00
252.04	B	6,000.00	6,100.00	6,250.00	6,350.00
252.04	C	6,075.00	6,175.00	6,325.00	6,425.00
160/170	A	6,540.00	6,600.00	6,700.00	6,760.00
160/170	B	6,580.00	6,640.00	6,740.00	6,800.00
160/170	C	6,620.00	6,680.00	6,780.00	6,840.00
160/170	D	6,660.00	6,710.00	6,820.00	6,870.00
340/350	A	6,425.00	6,540.00	6,765.00	6,880.00
340/350	B	6,520.00	6,630.00	6,860.00	6,970.00
340/350	C	6,600.00	6,710.00	6,940.00	7,050.00
340/350	D	6,670.00	6,785.00	7,010.00	7,125.00

Table 1-25 lists the information about the 7 GHz frequency band.

Table 1-25 Information about the 7 GHz frequency band (XMC-2 ODU)

T/R Spacing (MHz)	Sub-Band	Lower Sub-band TX Frequency (MHz)		Higher Sub-band TX Frequency (MHz)	
		Lower Limit	Upper Limit	Lower Limit	Upper Limit
154	A	7,428.00	7,484.00	7,582.00	7,638.00
154	B	7,470.00	7,526.00	7,624.00	7,680.00

T/R Spacing (MHz)	Sub-Band	Lower Sub-band TX Frequency (MHz)		Higher Sub-band TX Frequency (MHz)	
		Lower Limit	Upper Limit	Lower Limit	Upper Limit
154	C	7,512.00	7,568.00	7,666.00	7,722.00
154	D	7,128.00	7,184.00	7,282.00	7,338.00
154	E	7,170.00	7,226.00	7,324.00	7,380.00
154	F	7,212.00	7,268.00	7,366.00	7,422.00
161	A	7,114.00	7,177.00	7,275.00	7,338.00
161	B	7,149.00	7,212.00	7,310.00	7,373.00
161	C	7,180.50	7,247.00	7,341.50	7,408.00
161	D	7,219.00	7,282.00	7,380.00	7,443.00
161	E	7,239.00	7,302.00	7,400.00	7,463.00
161	F	7,274.00	7,337.00	7,435.00	7,498.00
161	G	7,309.00	7,372.00	7,470.00	7,533.00
161	H	7,344.00	7,407.00	7,505.00	7,568.00
161	I	7,414.00	7,477.00	7,575.00	7,638.00
161	J	7,449.00	7,512.00	7,610.00	7,673.00
161	K	7,484.00	7,547.00	7,645.00	7,708.00
161	L	7,519.00	7,582.00	7,680.00	7,743.00
161	M	7,539.00	7,602.00	7,700.00	7,763.00
161	N	7,574.00	7,637.00	7,735.00	7,798.00
161	O	7,609.00	7,672.00	7,770.00	7,833.00
161	P	7,644.00	7,707.00	7,805.00	7,868.00
168	A	7,443.00	7,499.00	7,611.00	7,667.00
168	B	7,485.00	7,541.00	7,653.00	7,709.00
168	C	7,527.00	7,583.00	7,695.00	7,751.00
168	D	7,110.50	7,170.00	7,278.50	7,338.00
168	E	7,163.00	7,205.00	7,331.00	7,373.00
168	F	7,198.00	7,236.50	7,366.00	7,404.50
168	G	7,226.00	7,261.00	7,394.00	7,429.00
196	A	7,093.00	7,177.00	7,289.00	7,373.00

T/R Spacing (MHz)	Sub-Band	Lower Sub-band TX Frequency (MHz)		Higher Sub-band TX Frequency (MHz)	
		Lower Limit	Upper Limit	Lower Limit	Upper Limit
196	B	7,149.00	7,233.00	7,345.00	7,429.00
196	C	7,205.00	7,261.00	7,401.00	7,457.00
245	A	7,400.00	7,484.00	7,645.00	7,729.00
245	B	7,484.00	7,568.00	7,729.00	7,813.00
245	C	7,568.00	7,652.00	7,813.00	7,897.00

2 Hybrid coupler

2.1 Device Type

The hybrid couplers is available in two series: 3 dB balanced hybrid coupler and 6 dB unbalanced hybrid coupler.

The features of the two series of hybrid couplers are as follows:

- The 3 dB balanced hybrid coupler divides one route of RF signals into two routes of RF signals of the similar power. Compared with the original signal, the power attenuation of each tributary signal is about 3 dB.
- The 6 dB unbalanced hybrid coupler divides one route of RF signals into two routes of RF signals of different power. Compared with the original signal, the power attenuation of the lower tributary signal is about 6 dB. Compared with the original signal, the power attenuation of the higher tributary signal is about 2dB.

2.2 Appearance

The hybrid coupler is an outdoor three-interface network component of the wireless transmission products.

[Figure 2-1](#) shows the appearance of the hybrid coupler.

Figure 2-1 Appearance of the hybrid coupler

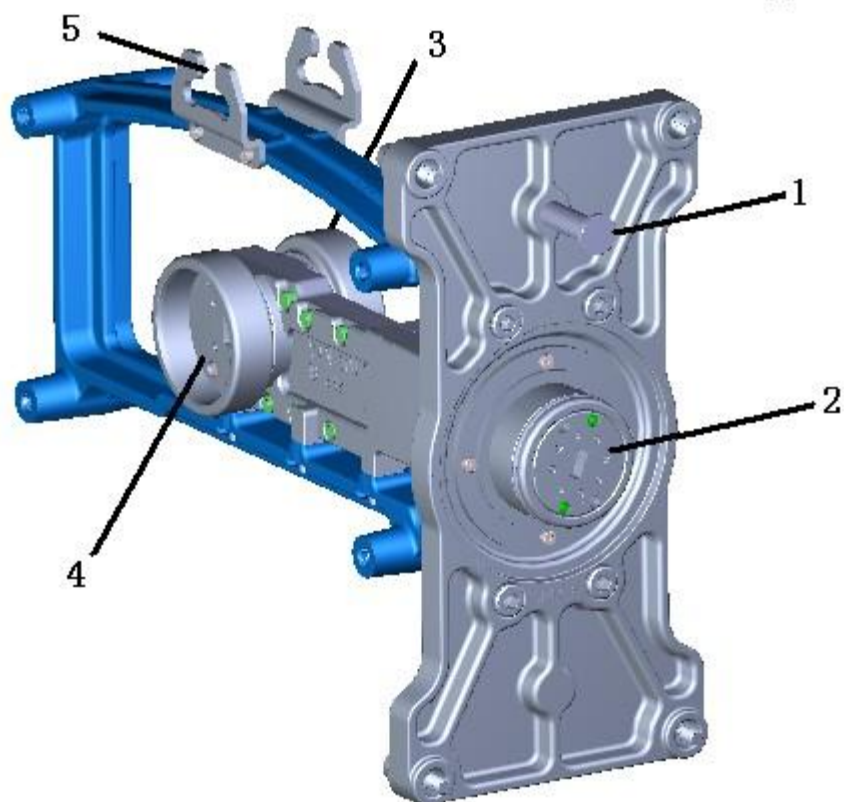


Table 2-1 describes the appearance of the hybrid coupler.

Table 2-1 Appearance description of the hybrid coupler

Number	Item	Description
1	Hook	Used together with the hook trough of the component connected to it to facilitate the installation of the hybrid coupler.
2	Antenna interface	See Interfaces on the Hybrid coupler .
3	Main tributary interface	
4	Extension tributary interface	
5	Hook trough	Used together with the ODU hook to facilitate the installation of the ODU.

2.3 Functions

The hybrid coupler is used to combine and divide RF signals.

The hybrid coupler has the following functions and features:

- In the TX direction, the hybrid coupler combines two routes of RF signals into one route and transmits the signals to the antenna.
- In the RX direction, the hybrid coupler divides the RF signals received from the antenna into two routes and transmits the signals to the ODU.

2.4 Interfaces

The interfaces of the hybrid coupler consist of the antenna interface, main tributary interface, and extension tributary interface.

Figure 2-2 shows the interfaces of the hybrid coupler.

Figure 2-2 Interfaces of the hybrid coupler

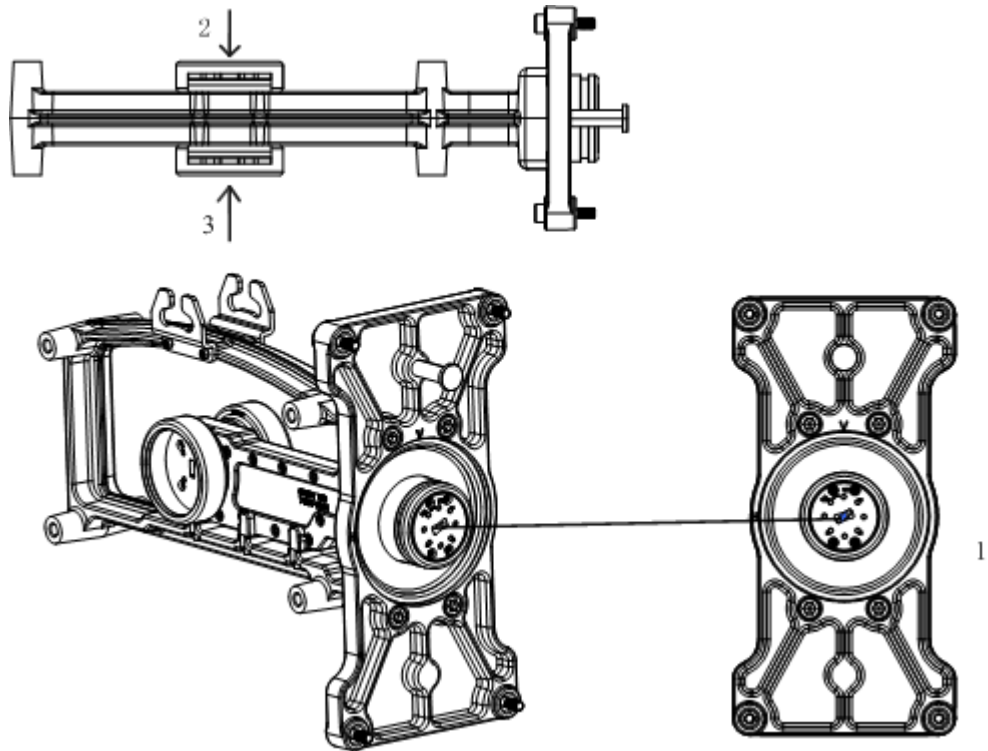


Table 2-2 describes the interfaces of the hybrid coupler.

Table 2-2 Interface description of the hybrid coupler

Serial No.	Interface Name	Interface Label	Function	Interface Type
1	Antenna interface	-	Used to connect with the antenna, antenna adapter, or flexible waveguide.	153IEC-R70, can be interconnected with the PDR70 (6 GHz frequency bands) 153IEC-R84, can be interconnected with the PBR84 (7/8 GHz frequency bands)
2	Main tributary interface	MAIN	Used to connect with the main ODU.	

Serial No.	Interface Name	Interface Label	Function	Interface Type
3	Extension tributary interface	STANDBY	Used to connect with the standby ODU.	

2.6 Label

The label of the hybrid coupler is attached to the hybrid coupler and packing case to identify the basic information of the hybrid coupler.

Figure 2-3 shows the label of the hybrid coupler.


Figure 2-3 Label of the hybrid coupler



Table 2-3 describes the parameters on the label.

Table 2-3 Meaning of the hybrid coupler label

Label Information	Content of the Label	Parameter	Meaning
Hybrid coupler name	Hybrid Coupler	-	Indicates that the component is a hybrid coupler.
Hybrid coupler model	C 15 U 06 R R C ① ② ③ ④ ⑤ ⑥ ⑦	①: Component type	C indicates the hybrid coupler.
		②: Frequency band	Indicates the working frequency of the hybrid coupler (GHz). The Range of the working frequency is as follows: 6/07.
		③: Tributary features	B: Balanced U: Unbalanced
		④: Coupling	03 indicates that the coupling of the tributary is 3 dB. 06 indicates that the coupling of the tributary is 6 dB.
		⑤: Type of the antenna interface	C: Circle waveguide R: Rectangular waveguide
		⑥: Type of the ODU interface	C: Circle waveguide R: Rectangular waveguide

Label Information	Content of the Label	Parameter	Meaning
		⑦: Type of the installation interface	Matches with the RTN XMC ODU.
Hybrid coupler code (ITEM)	52440562	-	Used to uniquely identify the model of each hybrid coupler.
Hybrid coupler description (DEP)	14.4GHz-15.4GHz,6dB,XMC ① ② ③	①: Range of the working frequency	Indicates the range of the working frequency of the hybrid coupler. (GHz)
		②: Coupling	Coupling of the main and extension tributaries (dB)
		③: Adaptation relationship	The hybrid coupler adaptive to the RTN XMC ODU.
Hybrid coupler serial number	21524405626D9A000001	-	Used to uniquely identify each hybrid coupler.
Bar code area		-	Bar code of the hybrid coupler serial number

2.7 Technical Specifications

The technical specifications of the hybrid coupler consist of the electrical specifications and mechanical specifications.

Table 2-4 lists the technical specifications of the hybrid coupler.

Table 2-4 Technical specifications of the hybrid coupler

	Frequency Band	Attenuation of the main path typical (dB)	Attenuation of the standby path typical (dB)	Minimum Isolation (dB)	Voltage Standing Wave Ratio (VSWR)	Interface Type
3 dB hybrid coupler	6 GHz	3.4	3.4	20	1.3	Can be interconnected with the PDR70
	7/8 GHz	3.6	3.6	20	1.3	Can be interconnected with the PBR84

	Frequency Band	Attenuation of the main path typical (dB)	Attenuation of the standby path typical (dB)	Minimum Isolation (dB)	Voltage Standing Wave Ratio (VSWR)	Interface Type
6 dB hybrid coupler	6 GHz	1.5	6.3	20	1.3	Can be interconnected with the PDR70
	7/8 GHz	1.7	6.5	20	1.3	Can be interconnected with the PBR84

Table 2-5 lists the mechanical specifications of the hybrid coupler.

Table 2-5 Mechanical specifications of the hybrid coupler

Power capacity (W)	8
Dimensions	< 410 x 330 x 190 (width x depth x height)
Weight (kg)	≤ 5

3 Separate Mounting Components

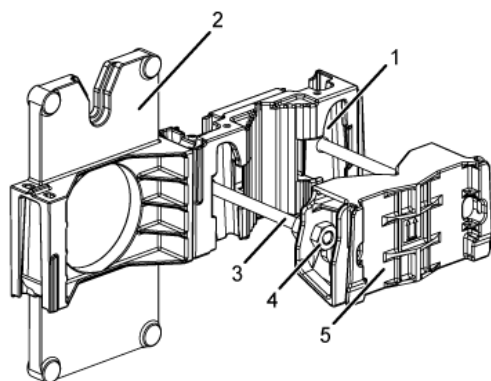
3.1 ODU Separate Mounting Bracket

When the ODU or hybrid coupler is installed with the antenna separately, the ODU separate mounting bracket can be used to fix the ODU or hybrid coupler on the pole.

Appearance

Figure 3-1 shows the appearance of the ODU separate mounting bracket.

Figure 3-1 Appearance of the ODU separate mounting bracket



1. Main bracket 2. Transfer component 3. Long bolt 4. Dual-port nut 5. Auxiliary bracket

The ODU separate mounting bracket can be used to install the ODU on the pole with a diameter of 51 mm to 114 mm.

The main bracket is used together with the auxiliary bracket, long bolt, and dual-port nut to fix the whole bracket on the pole. The ODU and hybrid coupler can be installed on the transfer component. The transfer component is connected with the main bracket in clamping mode.

3.2 Flexible Waveguide

A flexible waveguide is in rectangular form. It is used to connect the flange interface of the ODU or hybrid coupler with the flange interface of the antenna.

Appearance

Figure 3-2 shows the appearance of the flexible waveguide.

Figure 3-2 Appearance of the flexible waveguide



Technical Specifications

Table 3-1 lists the technical specifications of the flexible waveguide.

Table 3-1 Technical specifications of the flexible waveguide

Frequency Band	Length(m)	Maximum Attenuation (dB)	Maximum twist degree (°)	Minimum E-bend radius (mm)	Minimum H-bend radius (mm)	Minimum Voltage Standing Wave Ratio	Interface (Antenna side)	Interface (ODU/hybrid coupler side)
6 GHz	0.9/1.2/1.8	0.2/0.3/0.4	195	102	204	1.1	PDR70	PDR70
7/8GHz	0.9/1.2/1.8	0.3/0.4/0.6	240/320/480	76	152	1.1	PBR84	PBR84

4 Cables

4.1 IF Cable

The IF cable is used to connect the ODU with the IDU and transmits the IF signals O&M signals and -48 V power between the ODU and the IDU.

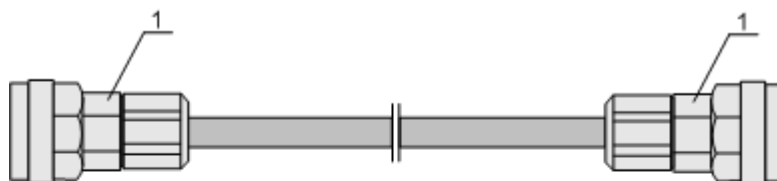
The IF cable can be categorized into three types: 5D cable, RG-8U cable, and 1/2-inch cable.

- If the distance between the IDU and the ODU is shorter than 120 m, the 5D cable is used. The 5D cable has an N-type connector at one end connected to the IF interface of the ODU and a TNC connector at the other end connected to the IF interface of the IDU.
- If the distance between the IDU and the ODU is from 120 m to 180 m, the RG-8U cable is used. The RG-8U cable has an N-type connector at each end. One end is connected to the IF interface of the ODU and the other end is connected with the IF jumper of the IDU.
- If the distance between the IDU and the ODU is from 180 m to 300 m, the 1/2-inch cable is used. The 1/2-inch cable has an N-type connector at each end. One end is connected to the IF interface of the ODU and the other end is connected with the IF jumper of the IDU.

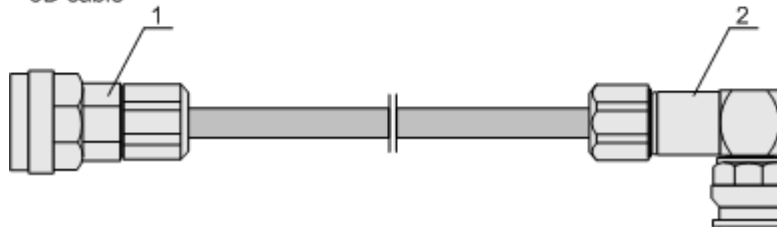
Cable Diagram

Figure 4-1 Diagram of the IF cable

RG-8U cable or 1/2-inch cable



5D cable



1. RF coaxial cable connector, N-type, male

2. RF coaxial cable connector, TNC-type, male

Technical Specifications

Table 4-1 Performance of the IF cable

Item	Performance		
	5D Cable	RG-8U Cable	1/2-Inch Cable
Characteristic impedance (ohm)	50	50	50
Attenuation (dB/100 m)	≤ 10.0 (140 MHz) ≤ 15.0 (350 MHz)	≤ 6.0 (140 MHz) ≤ 9.0 (350 MHz)	≤ 5.0 (140 MHz) ≤ 7.8 (350 MHz)
DC resistance (ohm/km at 20 °C)	≤11.0	≤4.9	≤4.3
Outside diameter of the cable (mm)	7.60	10.16	13.40

4.2 PGND Cable of the ODU

The ODU PGND cable is used to connect the grounding screw of the ODU to the outdoor ground point such as the ground point on the tower so that the ODU can be connected to the outdoor grounding grid.

Cable Diagram

Figure 4-2 Diagram of the ODU protection ground cable

