

**DBS3900 IBS
V100R001C02
DRH3985A&3917A&3919A&3919B
Hardware Description**

Issue **Draft A**
Date **2013-08-18**

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About This Document

Purpose

This document provides reference for planning and deploying a DC DRH. It presents the exterior and describes the ports, functions, cable types, connector specifications, and cable connections of the DRH.

Product Version

The following table lists the product version related to this document.

Product Name	Product Version
DBS3900 IBS	V100R001C02

Scope of application

The following table lists the DRH related to this document.

DRH Name	DRH Version
DRH3985A	V100R001C02
DRH3917A	V100R001C02
DRH3919A	V100R001C02
DRH3919B	V100R001C02

Intended Audience

This document is intended for:

- Base station installation engineers
- System engineers
- Site maintenance engineers

Organization

[1 Changes in DRH3985A&3917A&3919A&3919B Hardware Description](#)

This chapter describes the changes in *DRH3985A&3917A&3919A&3919B Hardware Description*.

[2 DRH Introduction](#)

This chapter describes the exterior and function of the DRH as well as the ports and indicators on the DRH.

[3 DRH Cables](#)

This chapter describes DRH cables.

[4 DRH Auxiliary Devices](#)

This chapter describes DRH auxiliary devices.

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1 Changes in DRH 3985A&3917A&3919A&3919B Hardware Description

This chapter describes the changes in *DRH3985A&3917A&3919A&3919B Hardware Description*.

Issue Draft A (2013-08-18)

This is the Draft A version.

2 DRH Introduction

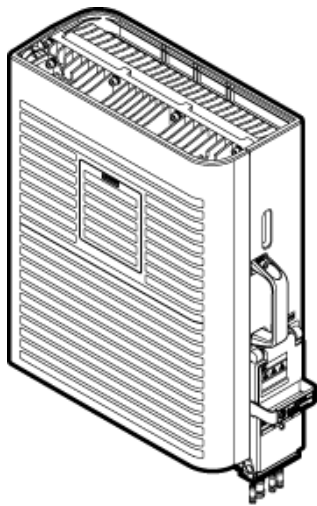
This chapter describes the function and exterior of the DRH as well as the ports and indicators on the DRH.

2.1 DRH Exterior

This section describes the exterior and dimensions of a DRH.

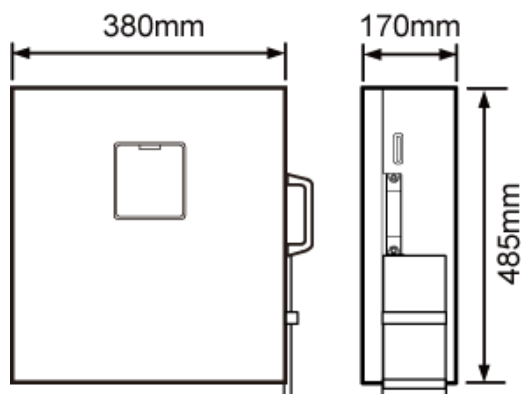
[Figure 2-1](#) shows an DRH.

Figure 2-1 DRH exterior



[Figure 2-2](#) shows DRH dimensions.

Figure 2-2 DRH dimensions



2.2 DRH Functions

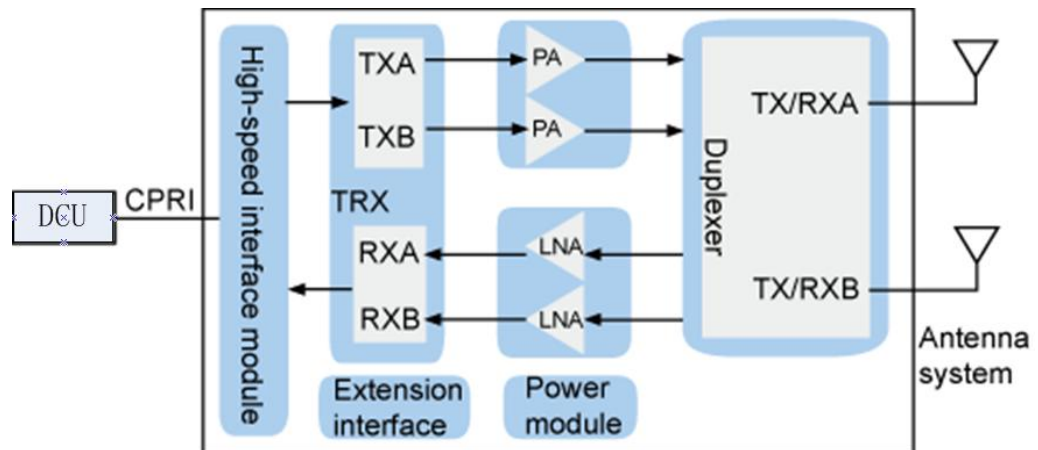
This section describes the main functions of the DRH.

The Distributed Remote Head (DRH) performs the following functions:

- Receives downlink baseband data from the DCU and sends uplink baseband data to the DCU.
- Receives RF signals from the antenna system, down-converts the signals to intermediate frequency (IF) signals, amplifies the IF signals, and performs analog-to-digital conversion. The transmit (TX) channel filters downlink signals, performs digital-to-analog conversion, and up-converts RF signals to the TX band.
- Multiplexes receive (RX) and TX signals on the RF channel, which enables these signals to share the same antenna path. It also filters the RX and TX signals.
- The DRH can be powered by the AC/DC power module. In this case, this DRH is called AC DRH.

An DRH consists of a high-speed interface unit, signal processing unit, power amplifier, and dual-duplexer. [Figure 2-3](#) shows the logical structure of the DRH.

Figure 2-3 Function structure of the DRH



2.3 DRH Technical Specifications

This section describes technical specifications of an DRH, including supported modes, frequency bands, RF specifications, engineering specifications, and antenna capabilities.

For details about technical specifications of an DRH, see section "Technical Specifications " in the *DBS3900 IBS V100R001C02 Product Description*.

2.4 DRH Ports

This section describes ports on the DRH panels. A DRH has a bottom panel, cabling cavity panel, and indicator panel.

[Figure 2-4](#) shows the ports on the DRH panels.

Figure 2-4 Ports on the DRH panels

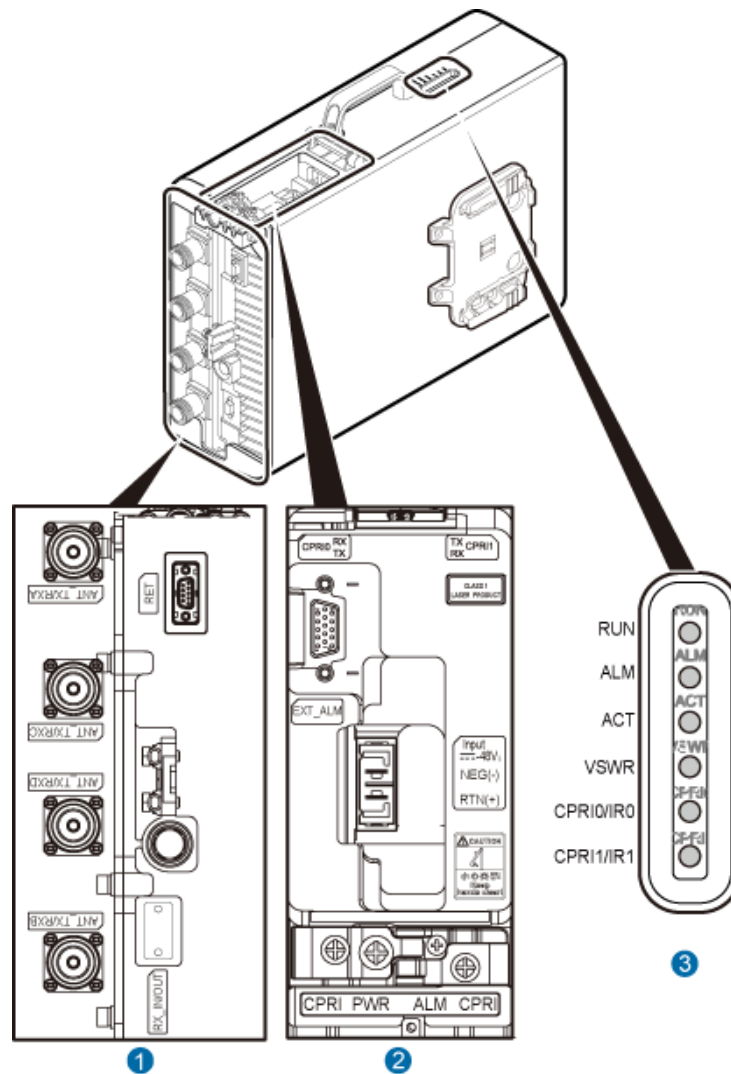


Table 2-1 describes ports and indicators on the DRH panels.

Table 2-1 Ports and indicators on the DRH panels

Item	Silkscreen	Description
(1) Ports at the bottom	ANT_TX/RXA	TX/RX port A
	ANT_TX/RXB	TX/RX port B
	ANT_TX/RXC	DRH not use this port
	ANT_TX/RXD	DRH not use this port
	RX_IN/OUT	DRH not use this port
	RET	DRH not use this port
(2) Ports in the	RTN(+)	Power supply socket

Item	Silkscreen	Description
cabling cavity	NEG(-)	
	CPRI0	Optical/electrical port 0
	CPRI1	Optical/electrical port 1
	EXT_ALM	Alarm monitoring port used for monitoring one RS485 signal and two dry contact signals
(3) Indicators	RUN	See 2.5 DRH Indicators .
	ALM	
	ACT	
	VSWR	
	CPRI0/IR0	
	CPRI1/IR1	

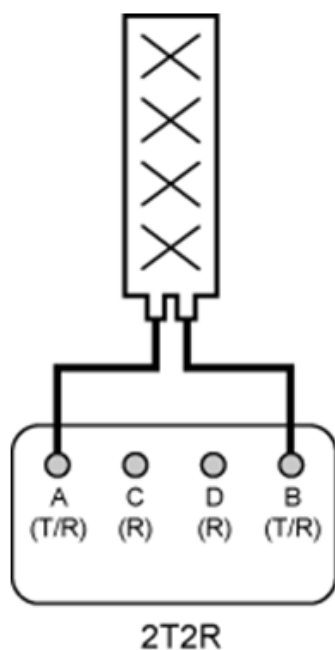
[Table 2-2](#) describes how to use RF ports.

Table 2-2 Usage

TX/RX Channel	Number of Used RF Ports	Usage	Remarks
2T2R	2	ANT_TX/RXA and ANT_TX/RXB used together	A single sector

[Figure2-5](#)Shows the usage of the RF ports on a DRH.

Figure 2-5 Usage



2.5 DRH Indicators

This section describes six indicators on a DRH. They indicate the running status.

For detailed positions of DRH indicators, see [2.4 DRH Ports](#).

[Table 2-3](#) describes DRH indicators.

Table 2-3 DRH indicators

Indicator	Color	Status	Meaning
RUN	Green	Steady on	There is power supply, but the module is faulty.
		Steady off	There is no power supply, or the module is faulty.
		Blinking (on for 1s and off for 1s)	The board is functioning properly.
		Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the module, or the module is not started.
ALM	Red	Steady on	Alarms are generated, and the module must be replaced.
		Blinking (on for 1s and off for 1s)	Alarms are generated. The alarms may be caused by the faults on the related boards or

Indicator	Color	Status	Meaning
			ports. Therefore, you need to locate the fault before deciding whether to replace the module.
		Steady off	No alarm is generated.
ACT	Green	Steady on	The module is running properly with TX channels enabled or the software is being loaded without DRH running.
		Blinking (on for 1s and off for 1s)	The module is running properly with TX channels disabled.
VSWR	Red	Steady off	No Voltage Standing Wave Ratio (VSWR) alarm is generated.
		Steady on	A VSWR alarm is generated on one or multiple ANT ports.
CPRI0/IR0	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.
CPRI1/IR1	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.

2.6 Optical Modules

An optical module transmits optical signals between an optical port and a fiber optic cable.

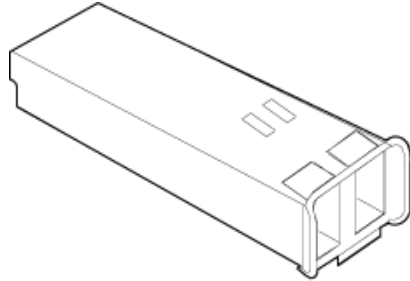
NOTE

The exteriors of an optical module and the label on an optical module in this section are for reference only. The actual exteriors may be different.

Exterior

The following figure shows the exterior of an optical module.

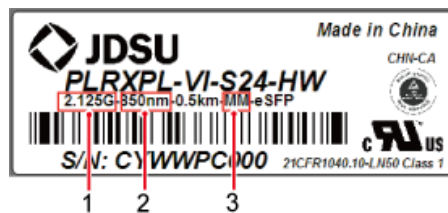
Figure 2-6 Exterior of an optical module



Label on an optical module

There is a label on each optical module, which provides information such as the rate, wavelength, and transmission mode, as shown in the following figure.

Figure 2-7 Label on an optical module



(1) Rate

(2) Wavelength

(3) Transmission mode

Optical Module Type

Optical modules can be divided into single- and multimode optical modules, which can be distinguished as follows:

- The puller of a single-mode optical module is blue and the puller of a multimode optical module is black or gray.
- The transmission mode is displayed as "SM" on the label of a single-mode optical module and "MM" on the label of a multimode optical module.

2.7 DRH Antennas(Only for U.S.A and Canada)

Type	Description
Omnidirectional Ceiling Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 5dBi
Directional Ceiling Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 6dBi
Wall Mount Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 8dBi
Yagi Directional antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 11dBi
Directional Outdoor Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 11.4dBi
Dual-polarized Omnidirectional Ceiling Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 5dBi
Dual-polarized Wall Mount Antenna	Frequency: 698MHz to 2700MHz; Maximum gain: 9dBi

3 DRH Cables

This chapter describes DRH cables.

3.1 DRH Cable List

This section describes DRH cable connections.

Table 3-1 lists DRH cables.

Table 3-1 DRH cables

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
3.2 DRH PGND Cable	OT terminal (M6, 16 mm ² or 0.025 in. ²)	Ground terminal on the DRH	OT terminal (M8, 16 mm ² or 0.025 in. ²)	Ground terminal on the ground bar
3.3 DRH Power Cable	Tool-less female connector (pressfit type)	NEG(-) and RTN(+) ports on the DRH	Depending on the power supply equipment	External power equipment
3.4 DRH Alarm Cable	DB15 male connector	EXT_ALM port on the DRH	Cord end terminal	External alarm device
3.5 CPRI Fiber Optic Cable	DLC connector	CPRI0 port on the DRH	DLC connector	CPRI port on a board in the DRH
3.6 DRH RF Jumper	DIN male connector	ANT_TX/RX A, ANT_TX/RX B, ANT_TX/RX C, or ANT_TX/RX D port on the	DIN male connector or DIN female connector	Antenna system

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
		DRH		

3.2 DRH PGND Cable

An DRH PGND cable connects a DRH and a ground bar, ensuring the proper grounding of the DRH. The maximum length of a DRH PGND cable is 8 m (26.25 ft).

Exterior

A PGND cable is green or green and yellow with a cross-sectional area of 16 mm² (0.025 in.²). An OT terminal is installed at each end of the cable. [Figure 3-1](#) shows a PGND cable.

Figure 3-1 PGND cable



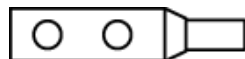
(1) OT terminal (M6, 16 mm² or 0.025 in.²) (2) OT terminal (M8, 16 mm² or 0.025 in.²)

NOTE

- If the customer prepares the PGND cable, a copper-core cable with a cross-sectional area of 16 mm² (0.025 in.²) or larger is recommended.
- One OT terminal must be added to each end of the PGND cable onsite.
- You can determine the color of the cable and whether to use corresponding two-hole OT terminals based on local regulations.

[Figure 3-2](#) shows a two-hole OT terminal.

Figure 3-2 Two-hole OT terminal



3.3 DRH Power Cable

The DRH power cable is a -48 V DC shielded cable. It feeds -48 V DC power to a DRH. The maximum length of a DRH power cable delivered with DRH s is 50 m (164.04 ft) by default.

 **NOTE**

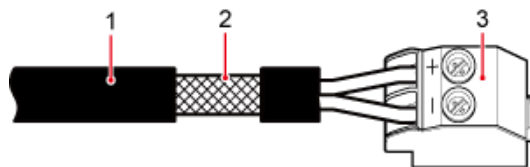
- The maximum length of power supply that a DRH power cable supports is 150 m (492.12 ft). Contact Huawei engineers when a DRH power cable greater than 50 m (164.04 ft) is required.
- If a power device provided by the customer is used, the recommended specification of the circuit breaker on this power device is 15 A to 30 A.

Exterior

There are three types of DRH power cables in terms of cross-sectional areas: 5.3 mm² (0.008 in.²) (10 AWG) and 8.2 mm² (0.013 in.²) (8 AWG) complying with North American standards and 6 mm² (0.009 in.²) complying with European standards.

A tool-less female connector (pressfit type) needs to be added to one end of the DRH power cable and a corresponding terminal needs to be added to the other end based on the requirements of the connector on the external power device, as shown in [Figure 3-3](#).

Figure 3-3 DRH power cable



- (1) -48 V DC power cable (2) Shield layer (3) Tool-less female connector (pressfit type)

[Table 3-2](#) lists the specifications of a DRH power cable.

Table 3-2 Specifications of a DRH power cable

Cable	Wire	Wire Color in Most Regions		Wire Color in Other Regions
		North American Standard	European Standard	UK
DRH power cable	RTN(+)	Black	Brown	Blue
	NEG(-)	Blue	Blue	Gray

3.4 DRH Alarm Cable

The DRH alarm cable, a shielded straight-through cable, transmits alarm signals from an external device to a DRH so that the base station monitors the operating status of external devices. The DRH alarm cable is 5 m (16.4 ft).

Exterior

An alarm cable has a DB15 male connector at one end and eight cord end terminals at the other end, as shown in [Figure 3-4](#).

Figure 3-4 Alarm cable



(1) DB15 male connector

(2) Cord end terminal

Pin Assignment

[Table 3-3](#) describes the pin assignment for the wires of a DRH alarm cable.

Table 3-3 Pin assignment for the wires of a DRH alarm cable

DRH Alarm Port	Pin of the DB15 Male Connector	Color	Type	Cord End Terminal	Description
Dry contact	X1.2	White and blue	Twisted pair	X2	SWITCH_INPUT0+
	X1.3	Blue		X3	SWITCH_INPUT0-(GND)
	X1.6	White and orange	Twisted pair	X4	SWITCH_INPUT1+
	X1.7	Orange		X5	SWITCH_INPUT1-(GND)
RS485	X1.10	White and green	Twisted pair	X6	APM RX-
	X1.11	Green		X7	APM RX+
	X1.13	White and brown	Twisted pair	X8	APM TX-
	X1.14	Brown		X9	APM TX+

3.5 CPRI Fiber Optic Cable

CPRI fiber optic cables are classified into multimode fiber optic cables and single-mode fiber optic cables. They transmit CPRI signals.

Multimode fiber optic cables connect the DCU and DRH or interconnect two DRHs. The maximum length of the multimode fiber optic cable between the DCU and DRH is 150 m (492.12 ft) and the multimode fiber optic cable between two DRHs has a fixed length of 10 m (32.81 ft).

A single-mode fiber optic cable consists of the single-mode pigtail and trunk single-mode fiber optic cable, and the single-mode pigtail and trunk single-mode fiber optic cable are interconnected using the ODF. The maximum length of the single-mode pigtail is 20 m (65.62 ft) on DCU side and 70 m (229.66 ft) on DRH side.

NOTE

- The ODF and trunk single-mode fiber optic cable are provided by the customer and must comply with the ITU-T G.652 standard.
- The ODF is an outdoor transfer box for fiber optic cables, which interconnects the single-mode pigtail and trunk single-mode fiber optic cable.
- A multimode fiber optic cable and a single-mode fiber optic cable are connected to a multimode optical module and a single-mode optical module, respectively.

Exterior

Multimode fiber optic cable: The multimode fiber optic cable has a DLC connector at each end, as shown in [Figure 3-5](#).

Figure 3-5 Multimode fiber optic cable



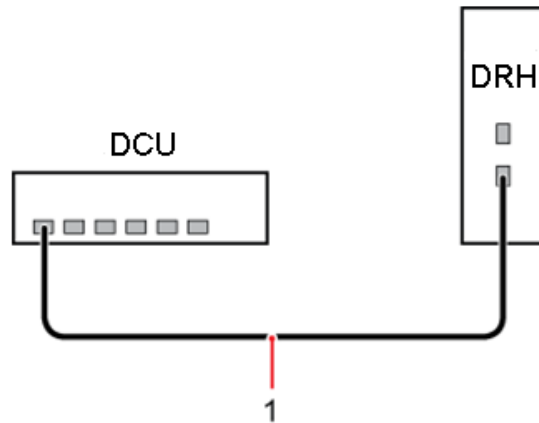
- (1) DLC connector (2) Breakout cable (3) Label on the breakout cable

NOTE

- When a multimode fiber optic cable connects a DCU and a DRH, the breakout cable on the DCU side is 0.34 m (1.12 ft) and the breakout cable on the DRH side is 0.03 m (0.098 ft).
- When a multimode fiber optic cable connects two DRHs, the breakout cable on both sides is 0.03 m (0.098 ft).

[Figure 3-6](#) shows the connection of the multimode fiber optic cable between a DCU and a DRH.

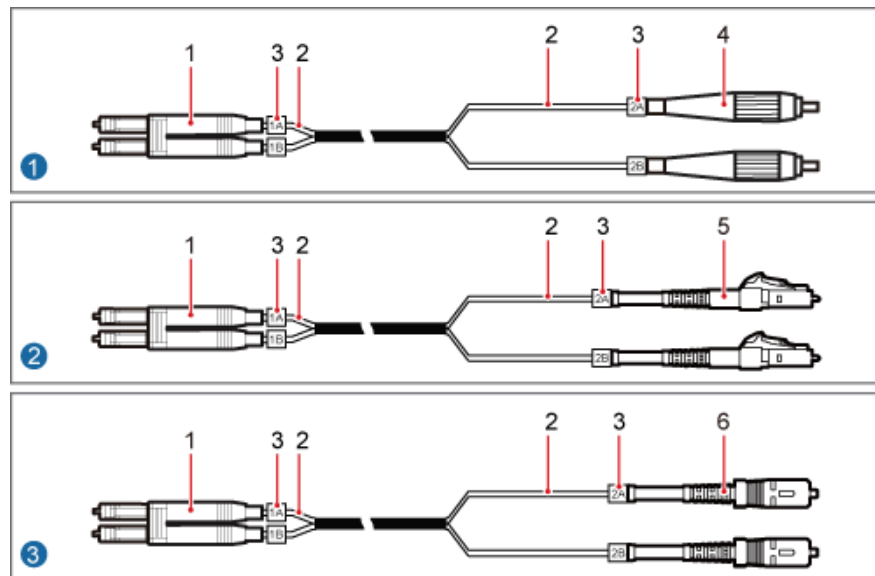
Figure 3-6 Connection of the multimode fiber optic cable between a DCU and a DRH



(1) Multimode fiber optic cable between a DCU and a DRH

Single-mode pigtail: The single-mode pigtail has a DLC connector at one end and an FC, LC, or SC connector at the other end, as shown in [Figure 3-7](#).

Figure 3-7 Single-mode pigtail



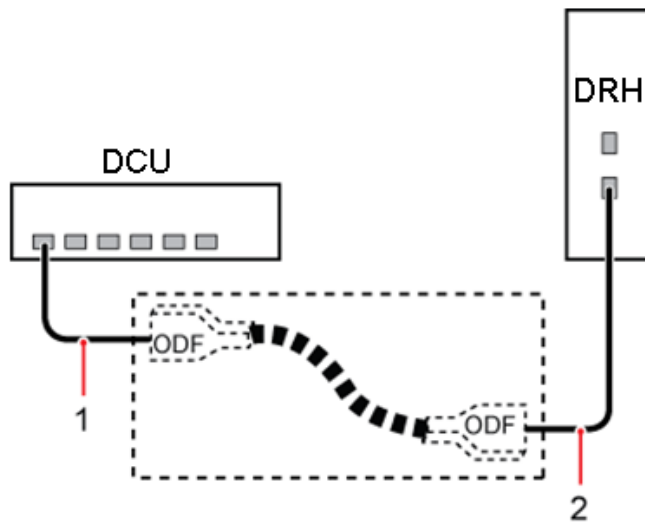
- | | | | | | |
|-------------------|--------------------|---------------------------------|------------------|------------------|------------------|
| (1) DLC connector | (2) Breakout cable | (3) Label on the breakout cable | (4) FC connector | (5) LC connector | (6) SC connector |
|-------------------|--------------------|---------------------------------|------------------|------------------|------------------|

 **NOTE**

- When a single-mode pigtail connects a DCU and an ODF, the breakout cables on the DCU side and ODF side are 0.34 m (1.12 ft) and 0.8 m (2.62 ft), respectively.
- When a single-mode pigtail connects a DRH and an ODF, the breakout cables on the DRH side and ODF side are 0.03 m (0.098 ft) and 0.8 m (2.62 ft), respectively.

Figure 3-8 shows the connection of the single-mode pigtail.

Figure 3-8 Connection of the single-mode pigtail



(1) Single-mode pigtail between a DCU and an ODF

(2) Single-mode pigtail between a DRH and an ODF

Selection Principles

The following table describes the principles for selecting CPRI fiber optic cables.

Table 3-4 Principles for selecting CPRI fiber optic cables

Remote Distance	Selection Principle	Remarks
Less than or equal to 100 m (328.08 ft)	Multimode fiber optic cable	Connects the DCU and DRH When it connects two DRHs, the distance between the two DRHs must be equal to or less than 10 m (32.81 ft).
Greater than 100 m (328.08 ft) and equal to or less than 150 m (492.12 ft)	Multimode fiber optic cable	Connects the DCU and DRH
	Recommended: single-mode fiber optic cable (single-mode pigtail and trunk single-mode fiber optic cable)	The single-mode pigtail at the DRH or DCU side is connected to the trunk single-mode fiber optic cable using the ODF.

Remote Distance	Selection Principle	Remarks
Greater than 150 m (492.12 ft)	Single-mode fiber optic cable (single-mode pigtail and trunk single-mode fiber optic cable)	

Pin Assignment

Table 3-5 describes the labels on and recommended connections for the breakout cables of a CPRI fiber optic cable.

Table 3-5 Labels on and recommended connections for the breakout cables of a CPRI fiber optic cable

Label	Installation Position		
	Multimode Fiber Optic Cable Between a DCU and an DRH	Multimode Fiber Optic Cable Between Two DRHs	Single-Mode Pigtail
1A	CPRI RX port on the DRH	CPRI RX port on DRH 1	RX port on the DCU or CPRI RX port on the DRH
1B	CPRI TX port on the DRH	CPRI TX port on DRH 1	TX port on the DCU or CPRI TX port on the DRH
2A	TX port on the DCU	CPRI TX port on DRH 0	ODF
2B	RX port on the DCU	CPRI RX port on DRH 0	ODF

3.6 DRH RF Jumper

The 1/2" DRH RF jumper transmits and receives RF signals between a DRH and an antenna. A fixed-length RF jumper used by an DRH is 2 m (6.56 ft), 3 m (9.84 ft), 4 m (13.12 ft), 6 m (19.68 ft), or 10 m (32.81 ft). A variable-length RF jumper used by a DRH has a maximum length of 10 m (32.81 ft).



NOTE

- When the distance between an DRH and an antenna is less than 10 m (32.81 ft), one end of the RF jumper is connected to the ANT-TX/RXA or ANT-TX/RXB port at the bottom of the DRH, and the other end is connected to the antenna.
- When the distance between a DRH and an antenna is greater than 10 m (32.81 ft), one end of the RF jumper is connected to a feeder, and the other end is connected to the antenna.
- If the customer prepares the RF jumper, the length of the RF jumper should be as short as possible and not exceed 2 m (6.56 ft.).

Exterior

An RF jumper has a DIN male connector at one end and a customized connector at the other end.

Figure 3-9 shows an RF jumper with a DIN male connector at each end.

Figure 3-9 RF jumper



(1) DIN male connector

4 DRH Auxiliary Devices

This chapter describes DRH auxiliary devices.

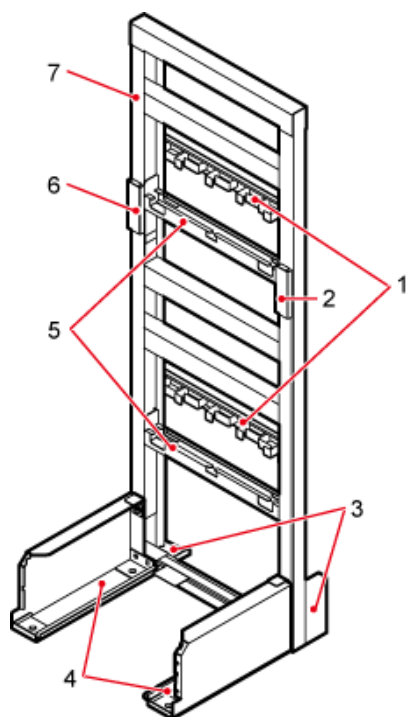
4.1 IFS06

An Indoor Floor installation Support (IFS06) is used for installing indoor DRHs.

Exterior

Figure 4-1 shows an IFS06.

Figure 4-1 IFS06



(1) Cable tray	(2) Ground bar 2	(3) Rear foot	(4) Front foot
(5) Adjustable beam	(6) Ground bar 1	(7) Main frame	-

Function

- It can be installed on the ground.
- It supports the installation of six DRHs.
- The upper and lower adjustable beams on an IFS06 can be moved up and down to fit for heights of DRHs.

Specifications

[Table 4-1](#) describes IFS06 specifications.

Table 4-1 IFS06 specifications

Item	Specification
Dimensions (H x W x D)	1730 mm (79 in.) x 600 mm (23.62 in.) x 600 mm (23.62 in.)
Weight	45 kg (99.23 lb)

5 Appendix

5.1 U.S.A Regulatory Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device does not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this device is modified without authorization from Huawei, the device may no longer comply with FCC requirements for Class B digital devices. In that a case, your right to use the device may be limited by FCC regulations. Moreover, you may be required to correct any interference to radio or television communications at your own expense.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device generates, uses and radiates radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user may take one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Reinforce the separation between the device and receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for assistance.



WARNING

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The minimum installed and operated distance between the radiator and your body of each model as below.

For DRH3985A, please keep 2.54m or more.

For DRH3917A, please keep 2.17m or more.

For DRH3919A, please keep 2.24m or more.

WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.



CAUTION

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user authority to operate the equipment.

5.2 Canada Regulatory Compliance

5.2.1 RSS-Gen statement

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

5.2.2 RSS-102 statement:

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The minimum installed and operated distance between the radiator and your body of each model as below.

For DRH3985A, please keep 2.54m or more.

For DRH3917A, please keep 2.17m or more.

For DRH3919A, please keep 2.24m or more.

Cet équipement est conforme à l'exposition aux rayonnements IC limites établies pour un environnement non contrôlé. Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. La distance d'installation et d'opération entre le radiateur et votre corps de chaque équipement doit être au minimum :

Pour DRH3985A, 2.54m ou plus.

Pour DRH3917A, 2.17m ou plus.

Pour DRH3919A, 2.24m ou plus.

Some Information

- (a) The nominal passband gain is 37dB;
- (b) The nominal bandwidth for each band is as follows:
 - 850M (DRH3985A): 27.95MHz
 - AWS (DRH3917A): 48.05MHz
 - 1900M (DRH3919A): 63.07MHz;
- (c) The rated mean output power is 2*20W;
- (d) The input and output impedance are 50Ω;
- (e) The following notice: "The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device."