

Service Description for Radio Network Implementation

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1 Service Overview

As specified in the service product portfolio, the radio network implementation service covers a series of radio network solution product regarding GSM-R, EWBB, Tristar.

1.1 Service Architecture

Huawei has a solid track record in delivering high-quality network implementation service to customers. The following figure shows the architecture of the radio network implementation service.

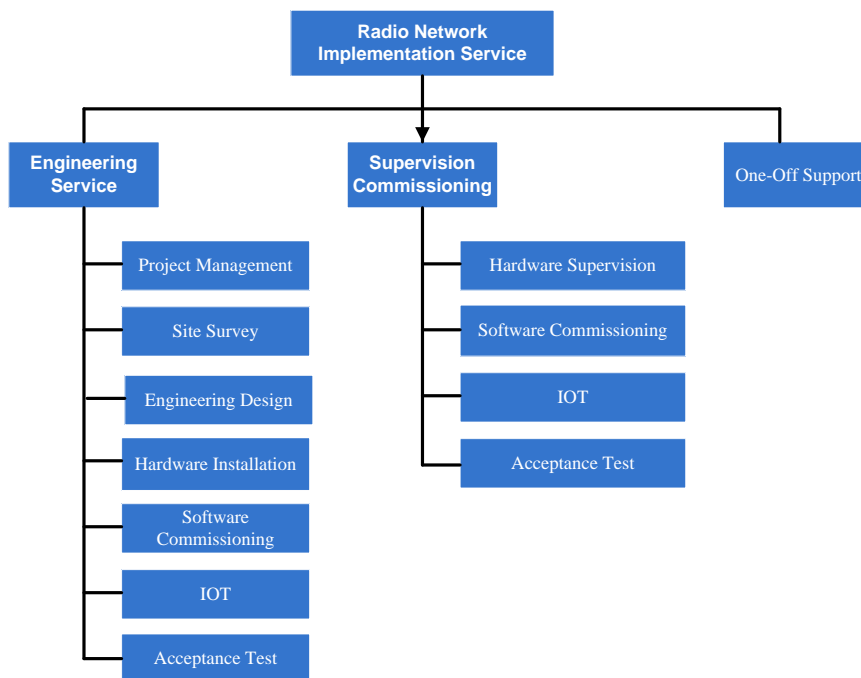


Figure 1-1: Architecture of the Implementation Service

2 Service Description

The radio network implementation service primarily consists of three parts: engineering service, supervision commissioning service, and one-off support service.

2.1 Engineering Service

Engineering service covers hardware installation, software commissioning, and global project management. The engineering service is delivered quickly and securely by Huawei based on Huawei's corporate platforms and rich experience in engineering.

Specifically, the engineering service consists of seven parts: project management, site survey, engineering design, hardware installation, software commissioning, interoperability testing (IOT), and acceptance testing.

2.2 Supervision Commissioning Service

Supervision commissioning service provides technical guidance for hardware installation and facilitates software commissioning. Huawei provides answers to product technology issues that may be raised during hardware installation, guides the installation personnel through hardware installation, verifies the installation, and helps the installation personnel correctly and quickly complete installation and commissioning tasks. The Supervision commissioning service consists of four parts: hardware supervision, software commissioning, IOT, and acceptance testing.

2.3 One-Off Support Service

When the customer encounters a problem and urgently needs to resolve it, Huawei can appoint experienced engineers to the customer's site, helping the customer quickly resolve the problem. This service is called one-off support service.

2.4 Service Details

2.4.1 Project Management

Definition

Project management is to monitor and manage all engineering implementation activities by following PMP and EPC processes in order to ensure that projects are completed as planned and required by the customer, without compromising project quality.

Content

Service Product	Service Module	Description	
Project management	Quality management	Project engineering quality management	
	Progress management	Project timetable management	
	Communication management	Supplier management	
		Subcontractor management	
		Customer communication	
	Cost management	Purchase cost	
		Labor cost	
	Scope management	Scope management	
	Technology management	Technology management	
Risk management	Risk management		
Customer satisfaction management	Project service satisfaction management		

- **Quality management:** Manages the project implementation quality to ensure that the project is controllable and is implemented efficiently.
- **Progress management:** Estimates the project period, prioritizes activities, produces a progress plan and updates it, and controls the implementation of the plan.
- **Communication management:** Manages suppliers and subcontractors, communicates with the customer about project implementation, and summarizes experience.
- **Cost management:** Properly estimates the purchase and labor costs and monitors the project cost accounting to ensure that the implementation service cost remains at an appropriate level.
- **Scope management:** Manages the project scope based on Huawei's rich experience in engineering.
- **Technology management:** Manages technologies used in projects based on Huawei's technology platform and through Huawei experts who provide remote support.
- **Risk management:** Manages risks in projects, for example, giving early warnings.

- **Customer satisfaction management:** Regularly communicates with the customer about various affairs during the project implementation process to improve customer satisfaction.

I. Deliverables

Service Activities	Deliverables
Project management	Project quality assessment report
	Project experience summary

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Project management				
Quality management	R	S	-	R
Progress management	R	S	-	R
Communication management	R	S	-	R
Cost management	R	S	-	R
Scope management	R	S	-	R
Technology management	R	S	-	R
Risk management	R	S	-	R
Customer satisfaction management	R	S	-	R

Introduction:

R: Responsibility

I: Information

S: Support

2.4.2 Site Survey

Definition

Site survey is to check the site conditions (including interior layout, power supply and cabling environments) based on the equipment configuration list.

Content

The site survey content varies with products.

Service Product	Service Module	Description 1)
Site survey	Device survey	Survey of equipment layout
		Survey of the power supply equipment
		Survey of the equipment monitoring system 2)
		Survey of equipment transmission and cable connections
		Survey of Antenna Feeder &RF system
		Survey of Clock 3)

 **Note:**

- 1) Wireless product survey service is mandatory when the scenery is newly built, expansion or migration.
- 2) Device monitoring system survey is optional regarding BSC and PS product.
- 3) Clock survey: Related to CDMA controller only. GUL and TD don't involved clock survey. GPS needs to be surveyed when NodeB is in the IP transmission scenery .The clock survey of IPCLOCK product is necessary when GPS/GLONASS/NodeB is in the IP transmission scenery.

- **Survey of equipment layout:** Makes a survey of the interior and exterior environments of the equipment room, the structure and dimensions of the equipment room, and existing equipment and auxiliary facilities (for example, whether the power supply, ground bar, air conditioner, cable tray, and elevated floor are available) to ensure that equipment can be successfully installed in the equipment room.
- **Survey of the power supply to equipment:** Makes a survey of the power system in the equipment room to ensure that the power supply supports the equipment to be installed.
- **Survey of the equipment monitoring system:** Makes a survey of the temperature sensor, humidity sensor, smoke sensor, door access system, water sensor, and mains cut-off protection system to ensure that the equipment to be installed can operate at a monitored environment.
- **Survey of equipment transmission and cable connections:** Makes a survey of cable connections, trunk cable and interface types, cascading cables between irregularly deployed cabinets, and external network cables, as well as cable tray and DDF/ODF provided by Huawei.
- **Survey of Antenna Feeder and RF system:** Make a survey of antenna, cable and trunk cable interface types.
- **Clock survey:** Makes a survey of clock source and clock cable to ensure the availability of clock source . It needs to be surveyed whether to install GPS clock or not regarding BTS.

I. Deliverables

Service Activities	Deliverables
Site survey	Site survey report

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Site survey				
Coordination for site survey	S	R	-	R
Preparations for site survey conditions and coordination for site entry	S	R	-	R
Confirmation on the installation environment	S	R	-	R
Collection of data about the installation environment	R	S	-	R
Site survey result and memorandum of understanding (MOU)	S	R	-	R

2.4.3 Engineering Design

Definition

Engineering design is to develop interior layout design plans and related regulations and produce design drawings based on the site survey report to provide guidance for equipment installation.

Content

The engineering design content varies with products.

Service Product	Service Module	Description
Engineering design	Engineering design	Design on equipment installation layout
		Design on equipment cable connections
		Calculation of the equipment's power consumption
		Antenna Feeder system design

 **Note:**

- 1) All wireless product survey and design service is mandatory when network scenery is newly built, expansion or migration.

- **Design on equipment installation layout:** Works out an equipment room layout diagram, a power port usage diagram, and a DDF/ODF/MDF port usage diagram to ensure that the project is implemented according to the design.
- **Design on equipment cable connections:** Works out a cable connection diagram for the equipment room, a ground bar usage diagram, an internal cable connection table for equipment, and an external cable connection table for equipment to ensure that the project is implemented according to the design.
- **Calculation of the equipment's power consumption:** Provides an equipment power consumption table to ensure that the power supply system in the equipment room supports the equipment to be installed.
- **Antenna Feeder system design:** the design of antenna and cable design.

I. Deliverables

Service Activities	Deliverables
Engineering design	Equipment room layout design report
	Equipment room cable connections design report
	Equipment port design report

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Engineering design				
Power supply access	S	R	-	R
Ground system	S	R	-	R
Installation materials	S	R	-	R
Cable design and installation	R	S	-	R

2.4.4 Hardware Installation

Definition

Hardware installation is to install the equipment and auxiliary materials and power on them. The equipment includes the main equipment and other equipment delivered with the main equipment.

Content

The following table lists details of the hardware installation service.

Service Product	Service Module	Description
Hardware installation	Equipment installation	Cabinet installation
		Subrack installation
		Board installation or adjustment
		Installation of optional modules
		Component equipment
		peripheral equipment
		GPS installation
	Cable installation	Cable installation
		Cable adjustment
	Antenna Feeder installation	Antenna installation
		Cable installation
		Antenna adjustment
		Cable adjustment
	Hardware self-check and power-on	Hardware self-check and power-on

 **NOTE:**

- 1) Wireless product hardware service is based on newly built network. Board or cable adjustment is involved in scenery such as expansion, migration and reconstruction.
- 2) “optional module installation” and “antenna and cable installation” only relates to base station, and other wireless products doesn’t involve these services.
- 3) GPS installation: only involved when the CDMA controller, base station and NodeB is in the IP transmission scenery. PS domain doesn’t involve GPS installation.
- 4) Supervision commissioning service only provides technical support, it doesn’t include equipment installation software commissioning and related specific work.
- 5) Supervision commissioning service and related installation/commissioning service can’t be provided at the same time.
- 6) No supervision service under implementation service: only provides hardware supervision service under supervision service; provide hardware and software supervision service under supervision service.

- **Cabinet installation:** Installs the cabinet based on Huawei's engineering installation regulations and the customer's requirements.
- **Subrack installation:** Installs the subrack based on Huawei's engineering installation regulations and the customer's requirements. The subrack installation service may be required in scenarios such as capacity expansion and network reconstruction.

- **Board installation or adjustment:** Installs or adjusts the board according to the planned board layout. The board installation or adjustment service may be required in scenarios such as network construction, capacity expansion, network reconstruction, and network migration.
- **Installation of optional modules:** Installs optional modules such as SFP and XFP modules.
- **Component equipment:** Mainly refers to equipment excluding chassis and board, which refers to equipment equipped with main equipment and need to be installed onsite such as routers, switches, BAM, KVM.
- **Peripheral equipment installation:** Include LMT and alarm box hardware installation.
- **GPS installation :**GPS need to be installed in some system(such as CDMA) or scenery (NodeB is in the IP transmission scenery)
- **Cable installation:** Installs interconnection cables and optical fibers that connect to the main equipment and auxiliary equipment.
- **Cable adjustment:** Adjusts cables that connect to the main equipment and auxiliary equipment. The cable adjustment service may be required in scenarios such as capacity expansion, network reconstruction, and network migration.
- **Antenna installation:** install antenna based on BS configure.
- **Cable installation:** only refers to the installation of cable and cable jumper.
- **Antenna adjustment:** involved in scenery such as expansion, migration or reconstruction.
- **Cable adjustment:** involved in scenery such as expansion, migration or reconstruction.
- **Hardware self-check and power-on:** Completes the quality check on the equipment against the quality checklist and modifies those unqualified items. After hardware installation is verified, powers on equipment and checks whether the indicators are functional.

I. Deliverables

Service Activities	Deliverables
Hardware installation	Packing list with the customer's signature
	Engineering quality inspection report
	Engineering MOU
	Hardware installation completion report

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Hardware installation				
Equipment supply	R	S	S	R
Supply of trunk cables and connections	S	R	S	R

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Installation of trunk cables	R	S	S	R
Unpacking inspection	R	R	R	R
Confirmation on the packing list with signature	R	R	R	R
Hardware self-check	R	-	S	R
Output of hardware-related documents	R	-	S	R

2.4.5 Software Commissioning

Definition

Software commissioning is to perform software adaptation, configuration, and commissioning on the equipment to ensure that the equipment is operational. The software commissioning service primarily covers the following:

- Prepares the network planning and design documents.
- Prepares commissioning data, tools, and instruments.
- Applies for and installs the software version and license.
- Loads configuration data.
- Performs software self-check.
- Interconnects logical links.

Content

Service Product	Service Module	Description
Software commissioning	Local commissioning	Software installation
		Data loading
		License loading
		Software self-check
	Commissioning of internal interfaces	Logical link interconnection

- **Local commissioning:** Commissions a single network element (NE), mainly including the following activities:

- Prepares the network planning and design documents.
- Prepares equipment commissioning data, system commissioning data, and commissioning tools and instruments.
- Applies for software version and license.
- Adapts to software version.
- Loads data (including license).
- Performs software self-check.
- **Software installation:** Loads or upgrades software version by following related documents.
- **Data loading:** Loads and activates the NE configuration file by following related documents.
- **License loading:** Loads and activates the license file by following related documents.
- **Software self-check:** Performs software self-check by following related software quality check documents (you can download these documents from Huawei's Support website) to ensure that software commissioning is complete and correct. After self-check, provides a completion report if required.
- **Commissioning of internal interfaces:** Commissions links between logical interfaces to ensure that these interfaces are in the UP state.

 Note:

- 1) All software commissioning service of wireless products must be quoted in the newly built network; not all service are involved in the expansion , migration scenery ,select service content based on customer requirement .
- 2) Network implementation radio product mainly includes radio controller, base station, PS packet domain, OSS, IPCLK and so on.
- 3) Internal interface commissioning only relates wireless commissioning between controller and base station, it doesn't involve interface test among controller, base station and CS, PS. LTE, Trustar doesn't involve this service .
- 4) Supervision commissioning service only provides technical support, it doesn't include equipment installation, software commissioning and related specific work.
- 5) Supervision service and related installation/commissioning service can't be provided at the same time
- 6) .No supervision service under implementation service: only provides hardware supervision service under supervision service; provide hardware and software supervision service under supervision service.

I. Deliverables

Service Activities	Deliverables
Software commissioning	Providing software version and license file by customer
	Self-check report

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Software commissioning				
Preparations for equipment commissioning and system commissioning data	R	S	S	R
Preparation for commission tools and instruments	R	S	S	R
Request for and verification of software version and license	R	-	R	S
Software version adaptation	R	S	R	R
Data loading (including license)	R	S	S	R
Software self-check	R	S	S	R

2.4.6 IOT

Definition

IOT is to test the connectivity between interfaces of different pieces of equipment. The IOT service covers the following:

- Enables interfaces.
- Performs protocol interoperability.
- Performs service interoperability.
- Performs NMS interoperability.

Description

Service Product	Service Module	Description
IOT	Interface interoperability	Interoperability of physical interfaces
		Interoperability of protocol interfaces
	Service interoperability	Voice service
		Data service
		Other services

Service Product	Service Module	Description
	NMS interoperability	Entity management system
		Global network management system

- **Interface interoperability:** Performs IOT on various types of interfaces of the equipment to ensure that the functions of the equipment are operational.
 - **Interoperability of physical interfaces:** Interoperates BSS interfaces and NSS interfaces to ensure that these interfaces are in the UP state.
 - **Interoperability of protocol interfaces:** Ensures that all routing protocols can be properly negotiated.
- **Service interoperability:** After the interface interoperability and preliminary network commissioning are complete, interoperates service interfaces of different systems to ensure that services are functional.
- **NMS interoperability:** Interoperates entity management systems and Global network management system to ensure that they are functional.

 Note:

- 1) All IOT test of wireless products must be quoted in the newly built network ; not all service are involved in the expansion , migration scenery ,select service content based on customer requirement 。
- 2) IOT test products mainly include radio controller, base station, PS, CS, OSS and so on.
- 3) Supervision only provides technical support; it doesn't include equipment installation, software commissioning and related specific work.
- 4) Supervision service and related installation/commissioning service can't be provided at the same time.
- 5) No supervision service under implementation service: only provides hardware supervision service under supervision service; provide hardware and software supervision service under supervision service。

I. Deliverables

Service Activities	Deliverables
IOT	Data configuration file
	Test report

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
IOT				
Preparations for equipment commissioning and system commissioning data	S	R	S	R
Preparation for commission tools and instruments	R	S	R	S
Preparation for transmission resources	S	R	S	R
Customer communication				
IOT	R	S	R	S

2.4.7 Acceptance Test

Definition

Acceptance test is to perform a function test and an acceptance test of equipment hardware and software to ensure that the equipment:

- Meets the customer's most basic requirements for equipment running and maintenance
Is able to carry the customer's services.
- Runs stably for a long time at the customer's live network.

The acceptance test service covers:

- Basic acceptance of hardware functions
- Basic acceptance of software functions
- Basic acceptance of services

Description

Service Product	Service Module	Description
Acceptance test	Basic acceptance of hardware functions	Acceptance of basic hardware functions and redundancy design
	Basic acceptance of software functions	Acceptance of software test cases
	Basic acceptance of services	Acceptance of basic services through test cases
	Output of acceptance documents	Acceptance document archiving

- **Basic acceptance of hardware functions:** Performs an acceptance test of the basic hardware functions based on the test cases agreed with the customer or the customer's designated third party to ensure the following:
 - The quantity and type of the equipment hardware are the same as those stipulated in the contract.
 - The equipment hardware is functional.
 - The protection and redundancy functions of the equipment hardware are functional, and the equipment can operate stably for a long time at the customer's live network.
- **Basic acceptance of software functions:** Performs an acceptance test of the basic software functions based on the test cases agreed with the customer or the customer's designated third party to ensure the following:
 - The equipment software, license, and system processes are functional.
 - Basic functions necessary for equipment running and maintenance, such as maintainability, performance statistics, and redundancy protection, are provided normally.
- **Basic acceptance of services:** Performs an acceptance test of the basic services based on the test cases agreed with the customer or the customer's designated third party.
- **Output of acceptance documents:** Produces professional acceptance documents based on test cases so that the customer can easily archive them and further know about the equipment through them. These documents contain details of test cases (such as test purpose, prerequisites, procedures, expected test result, and governing protocols and standards) and signature table.

I. Deliverables

Service Activities	Deliverables
Acceptance test	Acceptance test guide
	Acceptance test report and acceptance signature table

II. Responsibility Matrix

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Acceptance testing				
Preparation for tools	S	R	R	S
PAC application	R		R	
Defining of acceptance criteria, test items, and fault classification	R	R	R	R
Acceptance test based on the acceptance criteria agreed on by both parties	S	R	S	R

Service Activities	Engineering Service		Supervision Commissioning Service	
	Huawei	Customer	Huawei	Customer
Confirmation on the acceptance result with signature	R	R	R	R
Output of acceptance documents	R		R	R

2.4.8 Hardware Supervision

Definition

Hardware supervision is to provide technical guidance during equipment installation. Huawei gives answers to product technology issues that may be raised during hardware installation, guides the installation personnel through hardware installation, and helps them correctly and quickly complete installation tasks.

Description

Service Product	Service Module	Description
Hardware supervision	Unpacking inspection	Providing guidance on unpacking the goods
		Confirming with the unpacking inspection result
	Technical guidance on hardware installation	Delivering necessary hardware installation skills training, and specifying and transferring knowledge of installation modes in various scenarios
		Constructing exemplary sites
	Guidance on resolving hardware installation issues	Providing necessary onsite supervision
		Providing necessary technical support to the hardware personnel and responding to their technical inquiries
		Reporting and resolving shipment and goods issues
		Helping resolve goods damage issues during installation

Service Product	Service Module	Description
	Guidance on verifying the quality of hardware installation	Helping resolve other technical issues related to hardware installation
		Providing guidance on verifying the quality of hardware installation and offering quality criteria

- **Unpacking inspection:** Provides guidance to the hardware installation personnel to unpack and inspect the goods, confirms with the customer about the unpacking inspection result, and resolves goods issues.
- **Technical guidance on hardware installation:** Gives answers to technology issues that may be raised during hardware installation through telephone or onsite support. The mode to be used, telephone or onsite support, is determined based on project conditions and the customer's requirements.
- **Guidance on resolving hardware installation issues:** Provides guidance on resolving goods issues, for example, poor quality, during hardware installation and gives answers accordingly.
- **Guidance on verifying the quality of hardware installation:** Provides guidance on verifying the quality of hardware installation to ensure that the quality meets the customer's requirements.

 **Note:**

- 1) The hardware supervision service only provides technical support and does not cover detailed hardware installation operations and activities.
 - 2) The hardware supervision service and the hardware installation service must not be provided simultaneously.
 - 3) The engineering service does not contain any supervision service. The Supervision commissioning service only provides the hardware supervision service.
-