HCIP-LTE-RNP&RNO V1.0 Exam Outline

Certificate Summary

HCIP-LTE-RNP&RNO certification is positioned to validate the in-depth knowledge of LTE network principles, and the capabilities of design, application and optimization of LTE network features based on LTE networking features, radio network performance optimization and complaint analysis and handling, aiming at standardizing professional skills in LTE RNP&RNO.

HCIP-LTE-RNP&RNO certification curriculum includes but is not limited to LTE air interface principles, LTE protocol and signaling analysis, LTE network planning, Huawei LTE network optimization features, radio network performance management and optimization, radio network problem analysis and handling, and LTE and 2G/3G interoperability optimization.

With an **HCIP-LTE-RNP&RNO certification,** you demonstrate the capabilities of independently completing Huawei LTE network planning and cell parameter design, evaluating and applying network optimization features, managing wireless network performance, and analyzing performance problems, and optimizing performance.

With engineers who are **HCIP-LTE-RNP&RNO** certified, enterprises are able to conduct low-level design of Huawei LTE radio networks, manage and ensure network performance, and support user experience.

Prerequisites

None

Validity Period of Exam Results

This exam result is valid for 3 years.

Recertification Method

Before a certificate expires, the certificate holder can extend the validity of this certificate using the following method:

- *Take and pass the written examination again.*

Key Points of Exam

LTE Air Interface (7%)

1. The evolution of cellular networks and 3Gpp release
2. LTE Radio interface techniques
3. OFDMA/SC-FDMA principle, signal generation and processing
4. Radio interface protocols
5. Time-domain and frequency-domain structure in the radio interface in UL and DL for both FDD and TDD mode
6. Channel structure of the radio interface

7. Uplink/downlink transmission technique
8. The paging procedure
9. The cell search procedure
10. The random access procedure
11. Uplink/downlink power controls
12. HARQ
13. Concepts of layers, channel rank, spatial multiplexing, open and closed loop spatial multiplexing, TX diversity, beamforming, SU-MIMO and MU-MIMO

LTE Protocols and E2E Signaling (12%)

14. The detail signaling procedure of UE access network
15. The detail signaling procedure of paging
16. The detail signaling procedure of TAU
17. The detail signaling procedure of Handover
18. The detail signaling procedure of detach

LTE Radio Network Design and Planning (7%)

1. LTE Radio Network Coverage Dimensioning
   - LTE Radio Network Planning Introduction
   - LTE Radio Network Planning Process
   - LTE Radio Network Coverage Dimensioning
   - LTE Link Budget
   - Propagation Model
   - Site Number Dimensioning
2. LTE Radio Network Capacity Dimensioning
   - Capacity Dimensioning Procedure
   - Network Throughput
   - Introduction of Traffic Model
   - Traffic Model and Parameters
   - Network Throughput Calculation
   - Cell Throughput
   - DL Throughput Analysis
   - UL Throughput Analysis
   - Throughput per Cell(IP)
   - Capacity Dimensioning
3. LTE Cell Planning
   - LTE Radio Parameter Planning Overview
   - Frequency Planning
   - TA Planning
   - PCI Planning

- PRACH Planning

LTE Radio Network Features (20%)

1. LTE eRAN Idle Mode Behavior
   - Idle Mode Overview
   - PLMN selection
   - Cell selection
   - Cell reselection
   - System information reception
   - Tracking area registration
   - Paging monitoring procedure
2. LTE eRAN Handover Feature
   - Mobility Management Overview
   - Intra-frequency Handover
   - Inter-frequency Handover
3. LTE eRAN Power Control Feature
   - Power control overview
   - Downlink power control
   - Uplink power control
4. LTE eRAN Scheduling Feature
   - Overview of Scheduling
   - Downlink Scheduling
   - Uplink Scheduling
   - Scheduling Deployment Strategy
5. LTE eRAN CS Fallback
   - LTE Voice Solution
   - CS Fallback Procedure
   - Network Architecture for CS Fallback to UTRAN/GERAN
   - Combined EPS/IMSI Attach Procedure
   - CS Fallback to UTRAN
   - CS Fallback to GERAN
   - Decisions and Configuration of eNodeB in CS Fallback
   - Selection of CS Fallback Mechanisms
6. LTE eRAN Physical Channel Resource Management
   - PDCCH resource management
   - PDCCH symbols adaptively adjusted
   - CCE aggregation adaptively adjusted
   - DL/UL CCE ratio adaptively adjusted
   - PUCCH resource management
   - Adaptive SR period adjustment
   - Adaptive PUCCH resource adjustment

LTE Interoperability (7%)

1. LTE eRAN Interoperability in Idle Mode(LTE->GU)
   - LTE Interoperability in Idle Mode Overview
   - IRAT PLMN Selection Procedure
   - IRAT Cell Selection Criteria
   - IRAT Cell Reselection Criteria
   - IRAT Signaling Procedure in Idle Mode
2. LTE eRAN Interoperability in Connection Mode (LTE->GU)
   - Technical Overview and Basic Concepts
   - Measurement Configuration
   - Measurement Triggering/Stopping Phase of an IRAT Handover
   - Redirection
   - Blind Handover
   - Measurement Phase of an IRAT Handover
   - Decision Phase of an IRAT Handover
   - Execution Phase of an IRAT Handover
   - IRAT Signaling Procedure in Connection Mode

LTE Radio Network Optimize problem analysis (16%)

1. LTE Access Fault Diagnosis(Drive Test)
   - Basic Principle of Access
   - Access Fault Diagnosis Process
   - Operations of Access Fault Diagnosis
2. LTE Handover Fault Diagnosis(Drive Test)
   - Handover Procedure Review
   - Handover Fault Analysis
   - Typical Case of Handover Fault
3. LTE Call Drop Diagnosis (Drive Test)
   - Call Drop Fault Diagnosis Process
   - Operations of Call Drop Fault Diagnosis
   - Handling of call drop problems
4. LTE Traffic Fault Diagnosis (Drive Test)
   - Traffic Fault Diagnosis Process
   - Operations of Traffic Fault Diagnosis
   - Handling of Traffic Fault Issue
   - Typical Cases for Traffic Fault

LTE Radio Network Performance management (15%)

1. LTE eRAN KPI Introduction and Improvement

- LTE eRAN KPI Overview
- Performance Measurement System
- LTE eRAN KPI Details
- Accessibility KPI and Analysis
- Retainability KPIs and Analysis
- Mobility KPIs and Analysis
- Equipment Related and Analysis
- Utilization KPIs / Traffic KPI and Analysis
- Transport Performance Counter and Analysis
- LTE eRAN KPI Improvement
- LTE Performance Improvement

2. LTE Call Drop Diagnosis (KPI)
   - E-RAB Release Procedure
   - Call Drop Definition and KPI Statistics
   - Typical Call Drop Issue and Analysis Procedure
   - Typical Call Drop Issue Analysis
3. LTE Handover Fault Diagnosis(KPI)
   - Handover Failure Procedure
   - Handover Failure Definition and KPI Statistics
   - Typical Handover Failure Issue and Analysis Procedure
   - Typical Handover Failure Issue Analysis
4. LTE Wireless Parameter Audit and Key Parameter Optimization
   - LTE Global Parameter Introduction
   - LTE Parameter Classification
   - LTE Wireless Parameter Optimization Guidance
   - Parameter Audit Cases

LTE Voice Solution Overview (8%)

1. Voice Solution in LTE
2. CSFB and VoLTE Solution Comparison
3. VoLTE Network and IMS overview
4. Basic Flow of VoLTE

LTE-A Pro Key Technology Overview (5%)

1. MBB Industry Updates & Insights
2. 4.5G Definition and System Level Evolution
3. 4.5G Solution and Key Technologies

NB-IoT Overview（3%）

1. IoT Concept and Related Technology

2. NB-IoT E2E Solution and Network Architecture
3. NB-IoT Industry Evolution and Use Case

NOTE

The exam content provided here serves only as a general guide to participants. Other contents not mentioned here may also be included in the actual exam.

References

HCIP-LTE-RNP&RNO Training Material

Recommended Training Program

Training Program	Level	Duration
HCIP-LTE-RNP&RNO Training	III	15 days