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Your Extensible Software Defined Radio

## **YesDR Technical Specification**

### **YesDR TS 02.001**

Version 1.0.0

Release 1

## **YesDR Access Management Function (YAMF)**

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## 1 Scope

This specification defines the YesDR Access Management Function (YAMF).

YAMF is responsible for access control, registration management, authentication coordination, security context establishment, mobility handling, and interaction with other core network functions in the YesDR system.

YAMF is conceptually aligned with the 3GPP AMF defined in TS 23.501, while supporting simplified procedures suitable for SDR-based research and experimentation.

## 2 References

- YesDR TS 00.001 – Overall System Description
- YesDR TS 03.001 – YesDR Access Control Protocol (YACP)
- 3GPP TS 23.501 – System Architecture
- 3GPP TS 23.502 – Procedures
- 3GPP TS 33.501 – Security Architecture

## 3 Abbreviations

YAMF	YesDR Access Management Function
YUE	YesDR User Equipment
YBS	YesDR Base Station
YUDM	YesDR Unified Data Management
YAUSF	YesDR Authentication Server Function
YSMF	YesDR Session Management Function
YNRF	YesDR Network Repository Function
NAS	Non-Access Stratum
GUTI	Globally Unique Temporary Identifier

## 4 Functional Overview

YAMF performs the following functions:

- UE registration and deregistration
- Identity management (SUCI / GUTI)
- Authentication coordination with YAUSF
- NAS security context establishment
- Selection of ciphering and integrity algorithms
- PDU session coordination with YSMF
- NF discovery and registration via YNRF

## 5 Architecture

YAMF is a control-plane network function exposed via service-based interfaces and protocol-based YACP signaling.

It maintains UE contexts including:

- SUPI / SUCI
  - GUTI
  - Security keys ( $K_{AMF}$ )
  - UE security capabilities
  - Session identifiers
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## 6 Registration Management

YAMF SHALL support:

- Initial registration using SUCI
- Mobility registration using GUTI
- Registration accept and reject procedures

YAMF SHALL assign a new GUTI upon successful registration.

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## 7 Authentication Procedure

YAMF SHALL coordinate authentication with YAUSF using 5G-AKA principles.

The procedure includes:

1. Authentication vector request to YAUSF
2. Transmission of RAND and AUTN to YUE
3. Reception of RES\*
4. HRES\* verification
5. Final authentication confirmation

Authentication logic is consistent with the implementation in the YAMF reference module :contentReference[oaicite:1]index=1.

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## 8 Security Mode Control

YAMF SHALL:

- Parse UE security capabilities
- Select mutually supported ciphering and integrity algorithms
- Send Security Mode Command
- Establish NAS security context

Null algorithms MAY be used for research deployments.

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## 9 PDU Session Coordination

YAMF SHALL:

- Receive PDU Session Setup Requests
- Forward session requests to YSMF
- Deliver session response parameters to YBS

YAMF SHALL NOT allocate IP addresses directly.

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## 10 NF Discovery and Registration

YAMF SHALL register with YNRF at startup.

YAMF SHALL discover other network functions (YAUSF, YSMF, YRMF) dynamically using YNRF APIs.

Heartbeat procedures SHALL be supported.

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## 11 Error Handling

YAMF SHALL handle:

- Authentication failures
- Security mismatches
- Session allocation failures
- NF unavailability

Errors SHALL be logged and SHALL NOT cause uncontrolled termination.

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## 12 Relationship to 3GPP AMF

YAMF corresponds functionally to the 3GPP AMF but differs in the following aspects:

- Simplified signaling
- SDR-friendly integration
- AI-assisted radio and spectrum coordination

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