YESDR

Your Extensible Software Defined Radio

YesDR Technical Specification

YesDR TS 02.007

Version 1.0.0
Release 1

YesDR Radio Management Function (YRMF)

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1 Scope

This Technical Specification defines the YesDR Radio Management Function (YRMF).

YRMF is responsible for centralized radio resource management, including frequency allocation, bandwidth assignment, and transmit power control for YesDR base stations.

YRMF integrates AI-assisted spectrum intelligence via interaction with the YesDR Cognitive Radio Function (YCRF).

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2 References

2.1 Normative References

- YesDR TS 01.001: YesDR Overall Architecture
- YesDR TS 02.001: YesDR Core Network Functions
- YesDR TS 02.008: YesDR Cognitive Radio Function (YCRF)

2.2 Informative References

- 3GPP TS 38.300: NR Overall Description
- 3GPP TS 28 Series: Radio Network Management

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3 Definitions, Symbols, and Abbreviations

Abbreviation	Description
YRMF	YesDR Radio Management Function
YCRF	YesDR Cognitive Radio Function
YNRF	YesDR Network Repository Function
YBS	YesDR Base Station
RRM	Radio Resource Management
FFT	Fast Fourier Transform

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4 Functional Overview

YRMF performs the following functions:

- Dynamic frequency selection
- Bandwidth allocation
- Transmit power control
- AI-assisted radio resource decisions
- Coordination between multiple YBS nodes

YRMF SHALL expose service-based interfaces over HTTP.

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5 YRMF Architecture

YRMF consists of the following logical components:

- NRF registration and heartbeat client
- YCRF discovery and interaction client
- Radio resource allocation engine
- Policy and configuration handler
- Logging and telemetry module

YRMF SHALL register itself with YNRF and maintain liveness via periodic heartbeat messages :contentReference[oaicite:1]index=1.

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6 Service-Based Interfaces

6.1 Resource Allocation Service

6.1.1 Allocate Radio Resources

HTTP Method: POST
URI: /allocate-resources

Input Parameters:

- Requesting YBS identifier
- Location or deployment context (optional)

Output Parameters:

- Frequency (GHz)
- Bandwidth (MHz)
- Transmit Power (dBm)

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7 Interaction with YCRF

YRMF SHALL discover YCRF instances via YNRF.

YRMF SHALL retrieve spectrum intelligence from YCRF, including:

- Spectrum occupancy data
- Interference indicators
- Database URI for spectrum measurements

YRMF SHALL use this information to compute optimal radio resource allocations.

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8 Radio Resource Allocation Logic

YRMF SHALL perform the following steps:

1. Discover YCRF if not already known
2. Retrieve spectrum sensing results
3. Select frequency with minimal occupancy
4. Assign bandwidth and power based on policy
5. Return allocation decision to requesting entity

Allocation decisions MAY be static or AI-assisted.

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9 Logging and Telemetry

YRMF SHALL support:

- Local file-based logging
- UDP-based centralized logging
- Timestamped event reporting

Logs SHALL include resource allocation decisions and error conditions :contentReference[oaicite:2]index=2.

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10 Error Handling

YRMF SHALL return appropriate error responses for:

- YCRF unavailability
- Invalid allocation requests
- Internal processing failures

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11 Security Considerations

YRMF SHALL:

- Validate incoming requests
- Protect spectrum intelligence data
- Use secure transport for control interfaces

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12 Relationship to 3GPP RRM

YRMF aligns with radio resource management concepts in 3GPP systems while:

- Operating as a centralized cognitive controller
- Supporting AI-driven decision making
- Allowing SDR-based experimentation

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