YESDR

Your Extensible Software Defined Radio

YesDR Technical Specification

YesDR TS 04.002

Version 1.0.0
Release 1

YesDR Spectrum Management Protocol (YSMP)

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1 Scope

This Technical Specification defines the YesDR Spectrum Management Protocol (YSMP).

YSMP provides signaling procedures between the YesDR Base Station (YBS), YesDR Spectrum Monitor (YSM), and the YesDR Cognitive Radio Function (YCRF) for spectrum sensing, reporting, and dynamic spectrum allocation.

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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

2.2 Informative References

- 3GPP TS 23.501: System Architecture for the 5G System
- IEEE 1900 Cognitive Radio Standards

3 Definitions, Symbols, and Abbreviations

Abbreviation	Description
YSMP	YesDR Spectrum Management Protocol
YSM	YesDR Spectrum Monitor
YCRF	YesDR Cognitive Radio Function
YBS	YesDR Base Station
IE	Information Element
FFT	Fast Fourier Transform

4 Protocol Overview

YSMP is a control-plane protocol used for spectrum sensing, monitoring, and allocation in the YesDR system.

YSMP SHALL:

- Support spectrum scan configuration
- Report spectrum occupancy measurements
- Enable AI-assisted spectrum allocation decisions
- Operate independently of user-plane traffic

YSMP messages SHALL be encoded using a TLV-based format.

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5 YSMP Message Categories

- Interface Management
- Spectrum Scan Configuration
- Spectrum Measurement Reporting
- Spectrum Allocation Decisions

6 Interface Management Procedures

6.1 YSMSetupRequest

Message Type: 0x10

IE	Type	Description
YSM ID	0x01	Unique YesDR Spectrum Monitor Identifier
Location	0x02	Text-based deployment location
Capabilities	0x03	Supported sensing capabilities
Scan Bands	0x04	List of frequency bands to scan (MHz)
FFT Size	0x05	FFT bin count
Max Power	0x06	Maximum supported TX power (dBm)

6.2 YSMSetupResponse

Message Type: 0x11

Status Code	0x11	Setup result (0 = success)
Response Message	0x12	Human-readable status message
Assigned Frequency	0x13	Allocated operating frequency (MHz)
Assigned Bandwidth	0x14	Allocated bandwidth (MHz)
Allocated Power	0x15	Assigned transmission power (dBm)
Radio Resource Info	0x20	Resource allocation summary

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7 Spectrum Measurement Reporting

7.1 YSMReport

Message Type: 0x31

Timestamp	0x40	Time when report was generated
Start Frequency	0x41	Scan start frequency (MHz)
End Frequency	0x42	Scan end frequency (MHz)
Occupancy	0x43	Spectrum usage percentage
Number of Measurements	0x44	Sample count
Decision	0x45	Allocation or denial decision

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8 AI-Assisted Spectrum Management

YSMP supports AI-driven spectrum decision making via interaction with the YesDR Cognitive Radio Function (YCRF).

AI models MAY:

- Predict spectrum availability
- Classify signal types
- Recommend dynamic spectrum allocation

AI decisions SHALL be communicated through YSMP procedures.

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9 Error Handling

YSMP SHALL support:

- Invalid parameter detection
- Resource conflict resolution
- Allocation failure reporting

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10 Security Considerations

YSMP messages SHALL be protected using secure transport mechanisms. Unauthorized spectrum configuration attempts SHALL be rejected.

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