

Audio Video Testing – 4 Days

Day 1

1. Introduction to Audio-Video Testing – 3 hour

- ❖ What is Audio-Video Testing?
- ❖ Importance of AV Quality in Applications
- ❖ Types of AV Devices and Platforms
- ❖ Overview of AV Testing Challenges

2. Fundamentals of Audio and Video – 3 hour

- ❖ Audio Concepts: Sampling Rate, Bit Depth, Channels
- ❖ Video Concepts: Resolution, Frame Rate, Bitrate
- ❖ Compression and Codecs (e.g., AAC, MP3, H.264, VP9)
- ❖ Container Formats (MP4, MKV, AVI, MOV)

3. Test Environment Setup – 2 hour

- ❖ Hardware Requirements (Speakers, Microphones, Cameras, Displays)
- ❖ Software Tools (VLC, FFmpeg, Media Players, Analyzers)
- ❖ Network Setup for Streaming Tests
- ❖ Calibration of AV Equipment

Day2

4. Audio Testing – 3 hour

- ❖ Functional Tests: Playback, Recording, Volume Control
- ❖ Audio Quality Tests: Distortion, Noise, Echo, Latency
- ❖ Frequency Response and Signal-to-Noise Ratio (SNR)
- ❖ Audio Synchronization (Lip-sync Testing)
- ❖ Multi-Channel Audio Testing (Stereo, Surround Sound)
- ❖ Audio Codec Compatibility Testing

5. Video Testing – 3 hours

- ❖ Functional Tests: Playback, Pause, Seek, Resolution Switching
- ❖ Video Quality Metrics: PSNR, SSIM, VMAF
- ❖ Frame Rate and Jitter Analysis
- ❖ Video Synchronization with Audio
- ❖ Video Codec Compatibility Testing
- ❖ Aspect Ratio and Scaling Tests
- ❖ HDR and Color Accuracy Testing

6. Streaming and Network Testing – 2 hours

- ❖ Adaptive Bitrate Streaming (ABR) Testing
- ❖ Buffering and Playback Stability
- ❖ Network Bandwidth and Latency Effects
- ❖ Packet Loss and Error Resilience
- ❖ Live Streaming vs On-Demand Testing
- ❖ CDN and Multi-Device Playback Testing

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Day3

7. Compatibility and Interoperability Testing - 3 hours

- ❖ Cross-Platform Playback Testing (Windows, macOS, iOS, Android)
- ❖ Device Compatibility (Smart TVs, Mobile, Set-Top Boxes)
- ❖ Support for Various File Formats and Codecs
- ❖ DRM and Content Protection Testing

8. Automation in AV Testing – 3 hours

- ❖ Automated Playback and Regression Testing
- ❖ Scripting with FFmpeg for Batch Processing
- ❖ Automation Tools and Frameworks
- ❖ Continuous Integration for AV Projects

9. Accessibility Testing – 2 hours

- ❖ Closed Captions and Subtitles Verification
- ❖ Audio Description Testing
- ❖ UI and Control Accessibility for AV Apps

Day4

10. Performance and Stress Testing – 3 hours

- ❖ CPU/GPU Utilization During Playback
- ❖ Battery Consumption Testing on Mobile Devices
- ❖ Long Duration Playback Stability
- ❖ Handling of High-Resolution and 4K Content

11. Security Testing in AV – 3 hours

- ❖ Secure Streaming Protocols (DRM, HTTPS)
- ❖ Content Encryption and Decryption Testing
- ❖ Authentication and Authorization in Streaming Services

12. Logging, Debugging, and Reporting – 2 hours

- ❖ Capturing Logs from AV Devices and Apps
- ❖ Using Tools like Wireshark for Network Analysis
- ❖ Defect Reporting and Reproducibility
- ❖ Quality Metrics Reporting

Hardware to be used

- 1) Linux X86 PC 24.08, 22.04 or Linux VM with camera