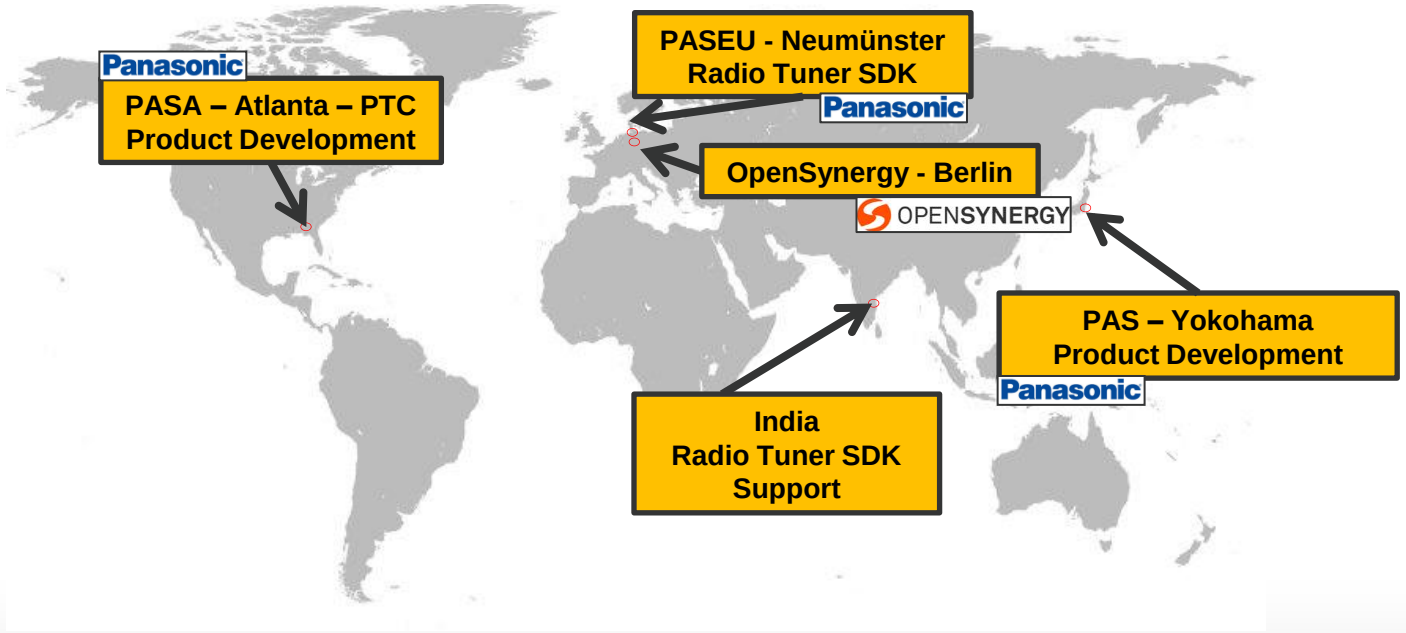
Accelerating Time-To-Market with Radio Tuner SDK over USB

Outline

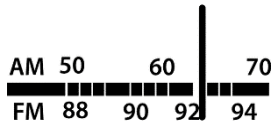
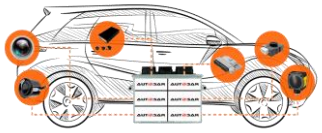
- Who we are
- Challenges in Automotive Radio
- Radio Tuner SDK
- USB Tuner Demo
- Conclusion
- Q&A

Introduction

- Located in Neumunster, North of Germany
- Meeting customer's needs since 2004
- Center of Competence for Radio Standards, Tooling, Benchmarking and Field-Testing
- Members of RDS, DAB and DRM Forums



OpenSynergy's Product Portfolio

Radio Tuner SDK A software radio component for automotive infotainment systems		• Software stack for world-wide tuner reception • Easy integration with multiple radio, SoC's, OS's • Supports most popular car radio tuners	• Infotainment • Connectivity
COQOS Cloud for Automotive Cloud Development		• Enables SDV development on ARM-based Virtual Architectures • Based on VIRTIO™ Standard and COQOS Hypervisor for binary portability across ARM-based SoC's • Develop before hardware is available	• Flexibility • Portability • Shift-Left
COQOS Lab for Remote Platform Access		• Enables remote testing of software and implement any hardware-related critical Safety and Security feature on a real target environment • Removes the bottleneck around evaluation board availability	• Optimization • Hardware Availability • Validation
COQOS Hypervisor SDK Hypervisor for Application Processors		• Guests: Linux, Android, AUTOSAR • Safety up to ASIL-B • Complete automotive use-cases out of the box	• Infotainment • Cockpit • ADAS
COQOS Hypervisor SDK for real-time processors Hypervisor for Microcontrollers		• Guests: AUTOSAR, RTOS • Safety up to ASIL-D • Freedom from interference and modular software update	• Domain Controller • Gateway • ADAS
Blue SDK / RapidLaunch Dual-mode embedded Bluetooth stack		• Supports complex automotive use-cases • Supports latest standard • Vendor-independent	• Infotainment • Connectivity • Non-automotive, IoT

Challenges in Automotive Radio

Analog Radio Standards
DAB/DAB+
HD Radio
FM
DRM30
CDR
DRM+
AM
Digital Radio Standards

Seamless Linking
Service / AF Following
RDS strategy
Announcements
Co-Channel
Background Scan

ETSI Standard Compliance
Certification
Regionalization (REG)
Hybrid Radio
Learn Memory

Chipmaker diversity
Firmware Update
Market Diversity
Chipset diversity
Chipset generations

TMC
EPG SPI
TPEG
Radio Data System (RDS/RBDS)
TII
Slideshow
Meta Data
Artist Experience

Radio Tuner SDK

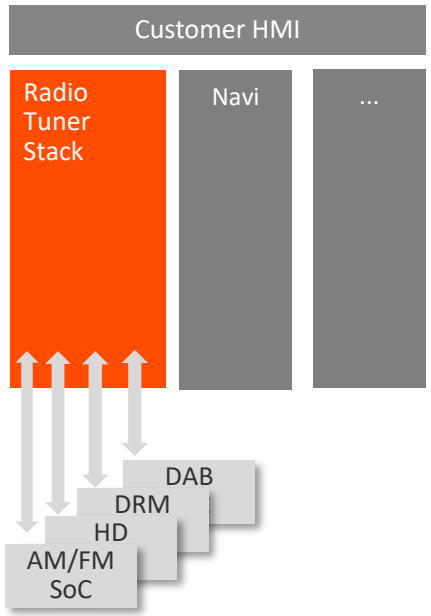
The Radio Tuner SDK

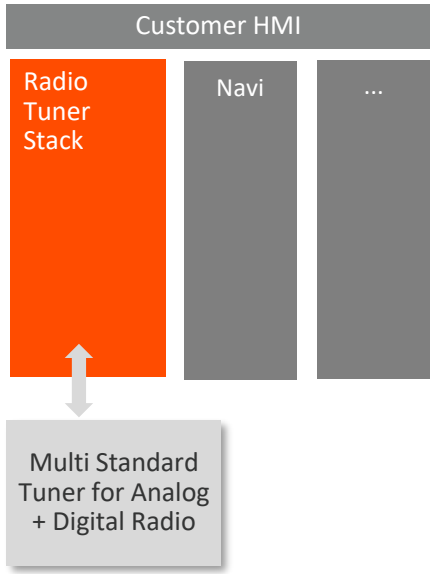
A software radio component for automotive infotainment systems

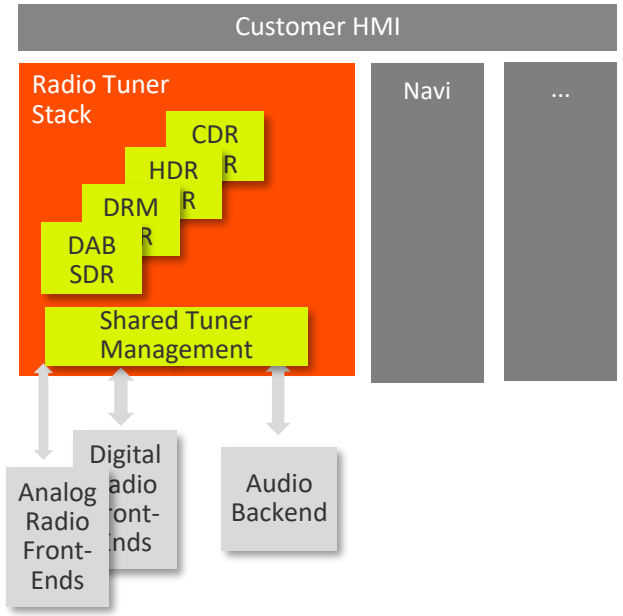
- Supports different broadcast standards worldwide
- Supports chipsets from major makers
- Supports Android Broadcast HAL, Linux and QNX
- Comes with integration and optimization tools (e.g. Radio GUI and Service Tool)
- Enables hybrid radio
- Rapid prototyping with USB tuner NEW

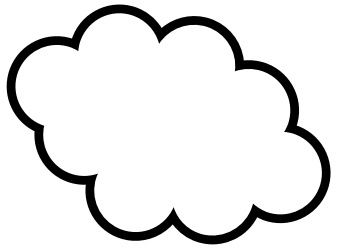
Generations of Radio Tuner SDK

1st Generation | 2nd Generation | 3rd Generation | Next Generation









- Dedicated Tuner SoCs
- Multi-standard tuner hardware
- Software Defined Radio
- Wideband multi-tuner systems
- Shared tuner management

Supported OS + Tuner SoCs

NXP Tuners

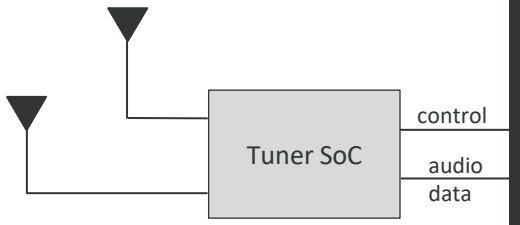
- SAF400x (Mercury Family)
- TEF7100 (Merlin)
- TEF3200 (Radion)
- Older products supported as well

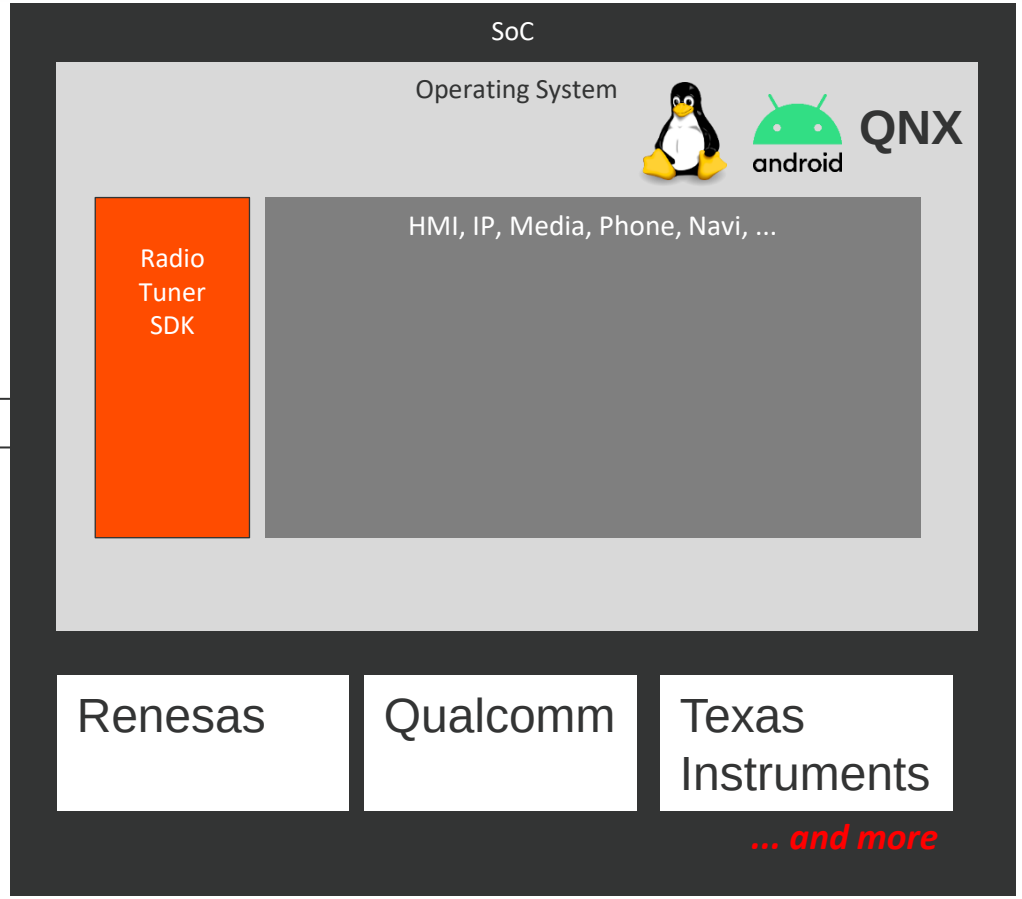
Skyworks Tuners

- SI47X (Dual Eagle Tuner)
- SI46X (Dual Falcon Digital Decoder)

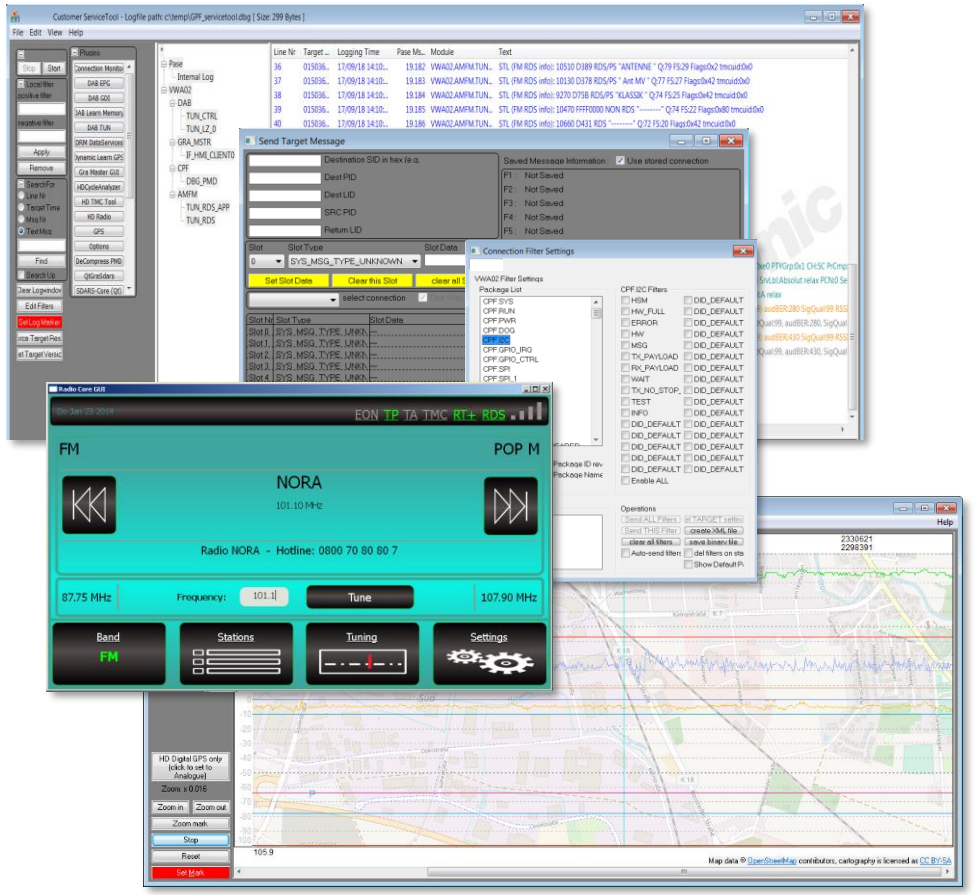
Panasonic Tuners

- Panasonic's Cubit Family (Amigo3.5)



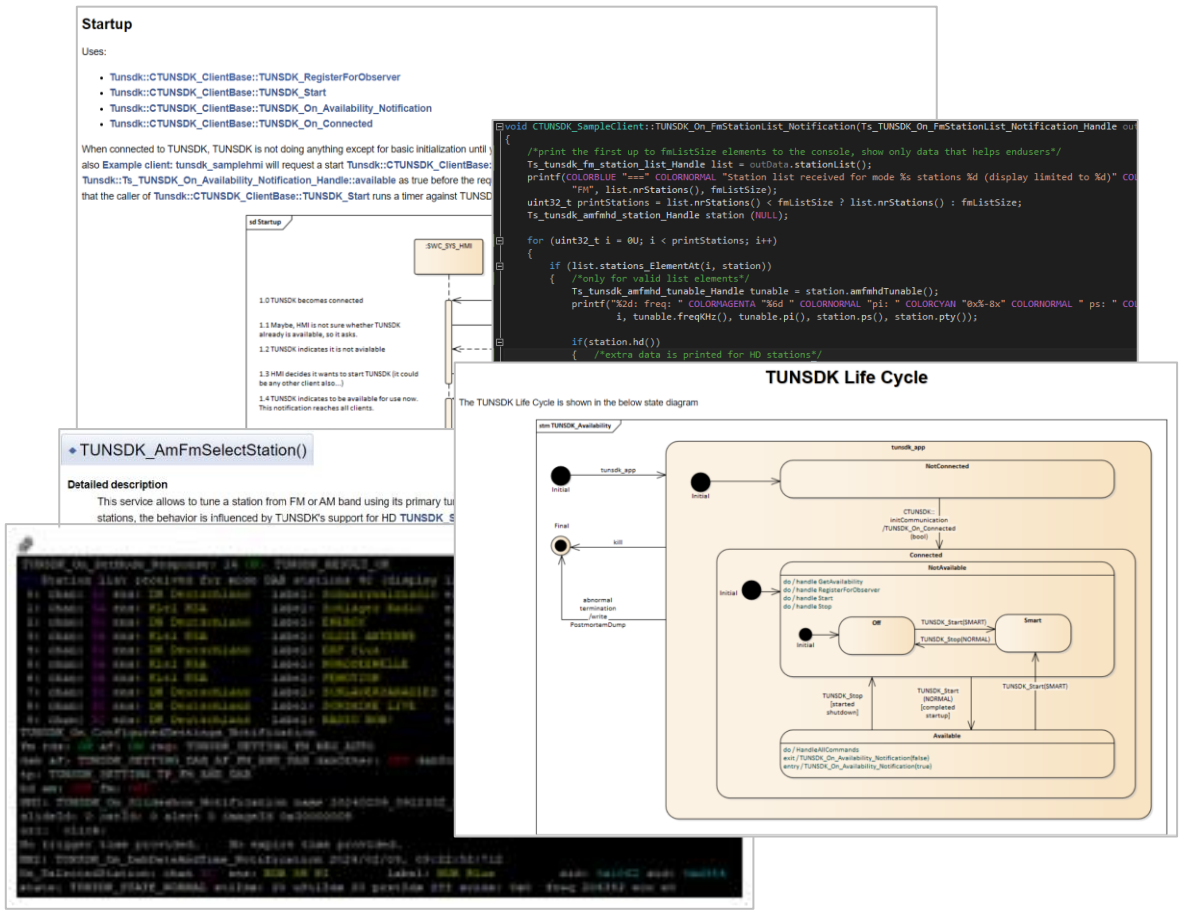


Radio Tuner SDK Tooling



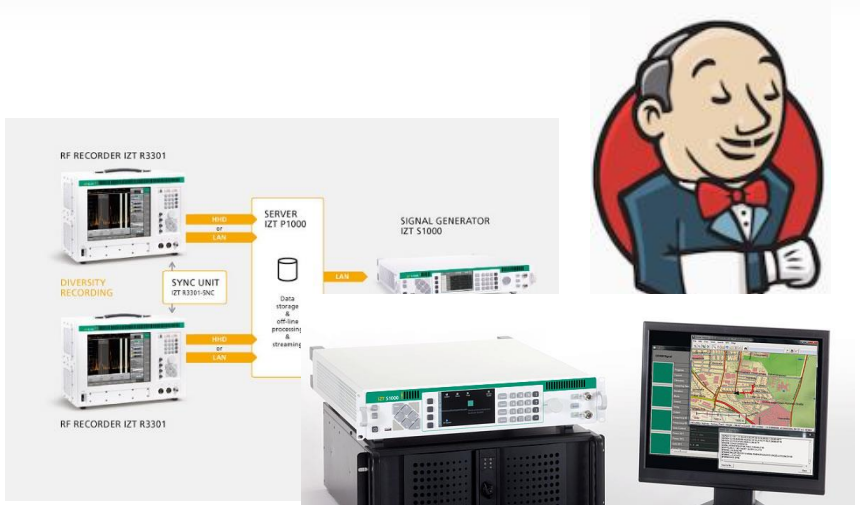
- Service Tool (SVT) as Windows Application for development and testing
- Access to low-level tuner configurations and parameters for optimization
- Quality Monitor plugin supports real-time monitoring of quality parameters and car position for later evaluation and reproduction

Radio Tuner SDK Integration Support



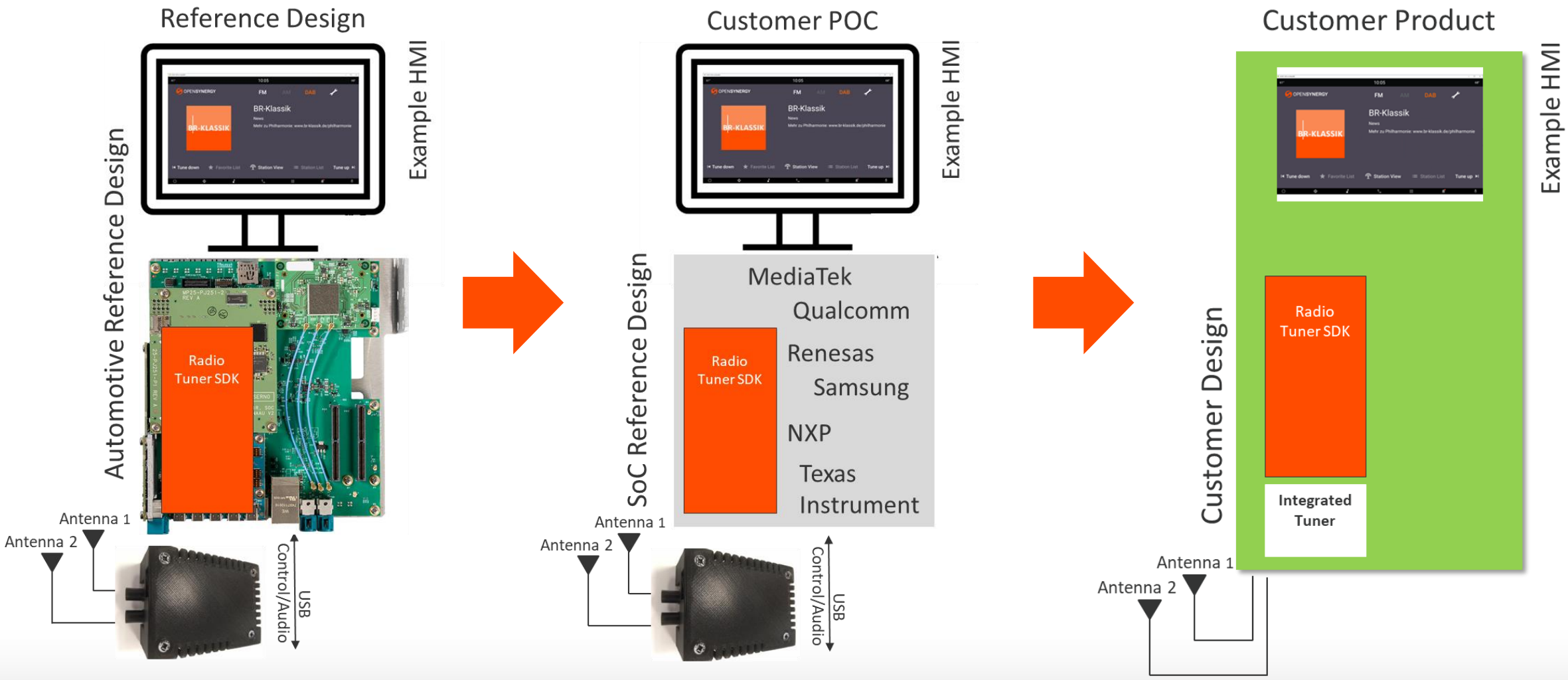
- **Exhaustive developer documentation is available explaining the dynamic behavior**
  - **API documentation**
  - **State machines**
  - **Typical Use case descriptions including sequence diagrams**
- **A simple console client for Radio Tuner SDK is provided in source to support your integration activities**
  - Get things running on day one!
  - Run reference implementation in parallel to your HMI during development

Radio Tuner SDK Testing



- Radio Tuner SDK is tested using automated and manual tests using recordings from the field, live signals and artificial signals.
- RF-recordings are available from: EU, UK, North America, Japan, Thailand, China and more
- Recordings are fed into Radio Tuner SDK during Continuous Integration Testing
- A test car is used to verify reception performance in the field. Up to three infotainment systems are compared in parallel.
- A Radio Tuner SDK engineer can join you on a field test on request.

Radio Tuner SDK - Reference Design to Product



Radio Tuner SDK
USB Tuner Demo

Demonstrator Overview

- The demonstrator presents Radio Tuner Software Development Kit (SDK) running in a Hypervisor environment
- The demonstrator shows a typical NAR device supporting HD Radio
- TunerSDK is split in two parts: Only the Broadcast HAL implementation is deployed to Android.

Hardware

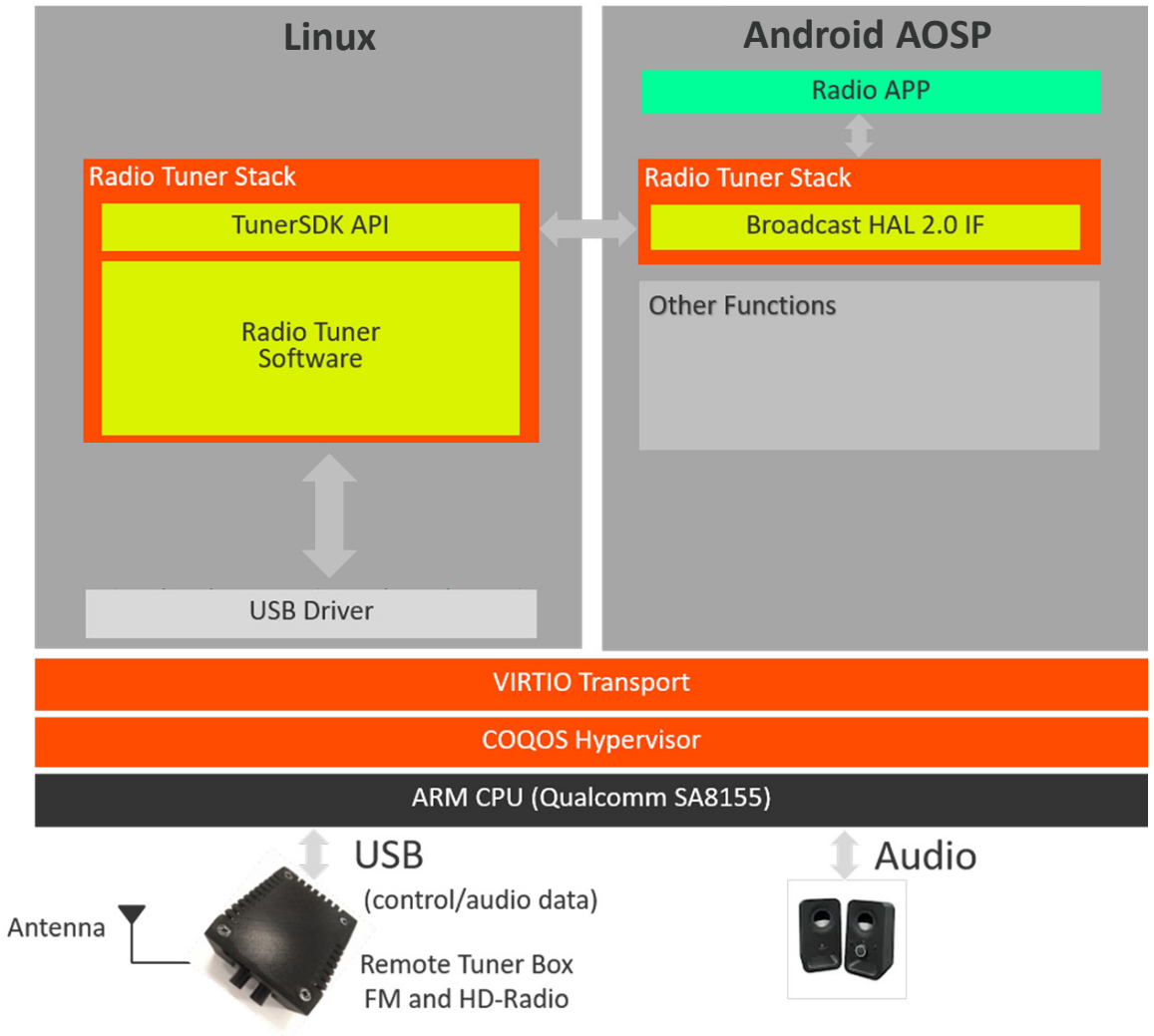
- Standard ADP Board

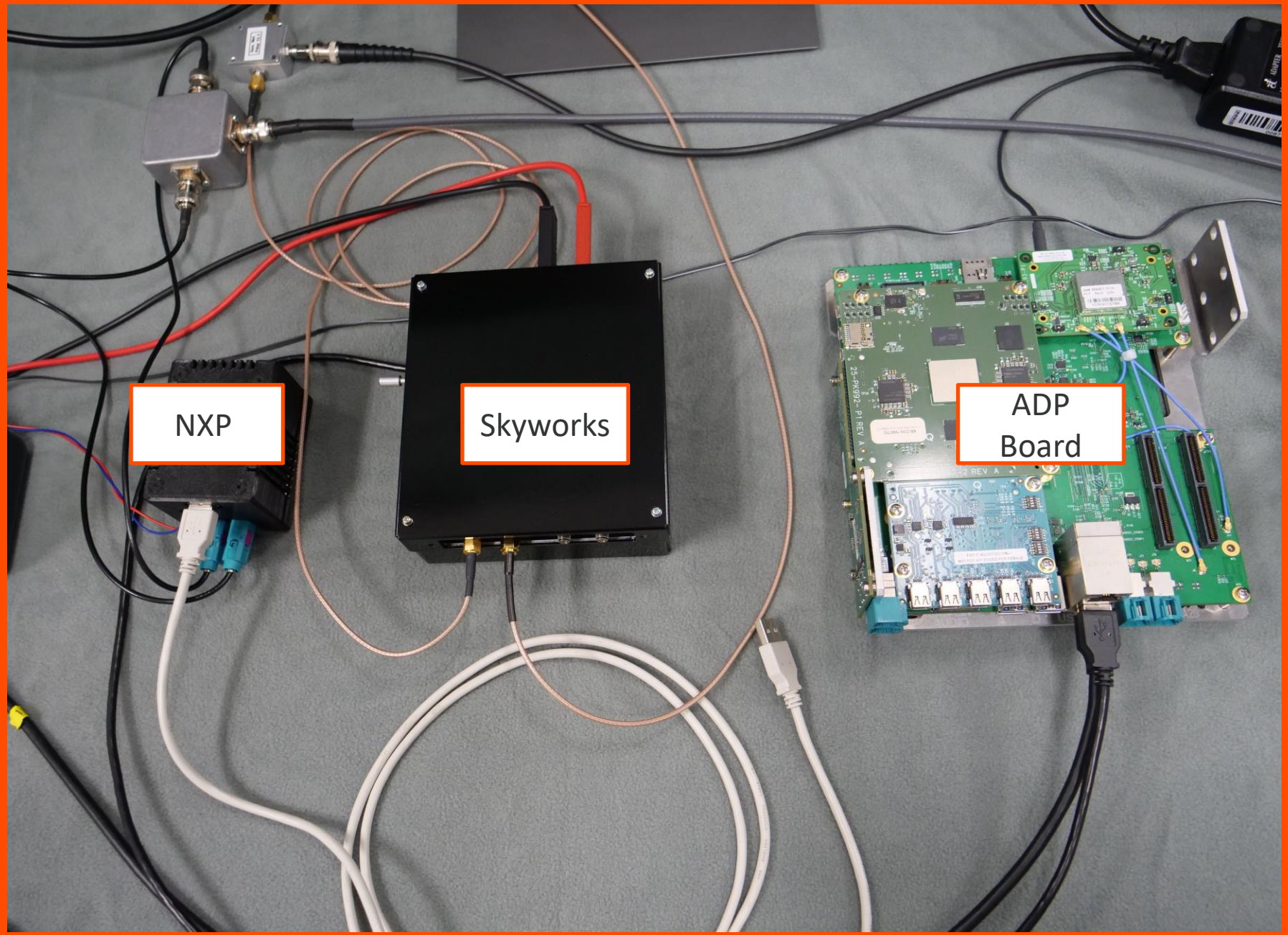
Processor & OS

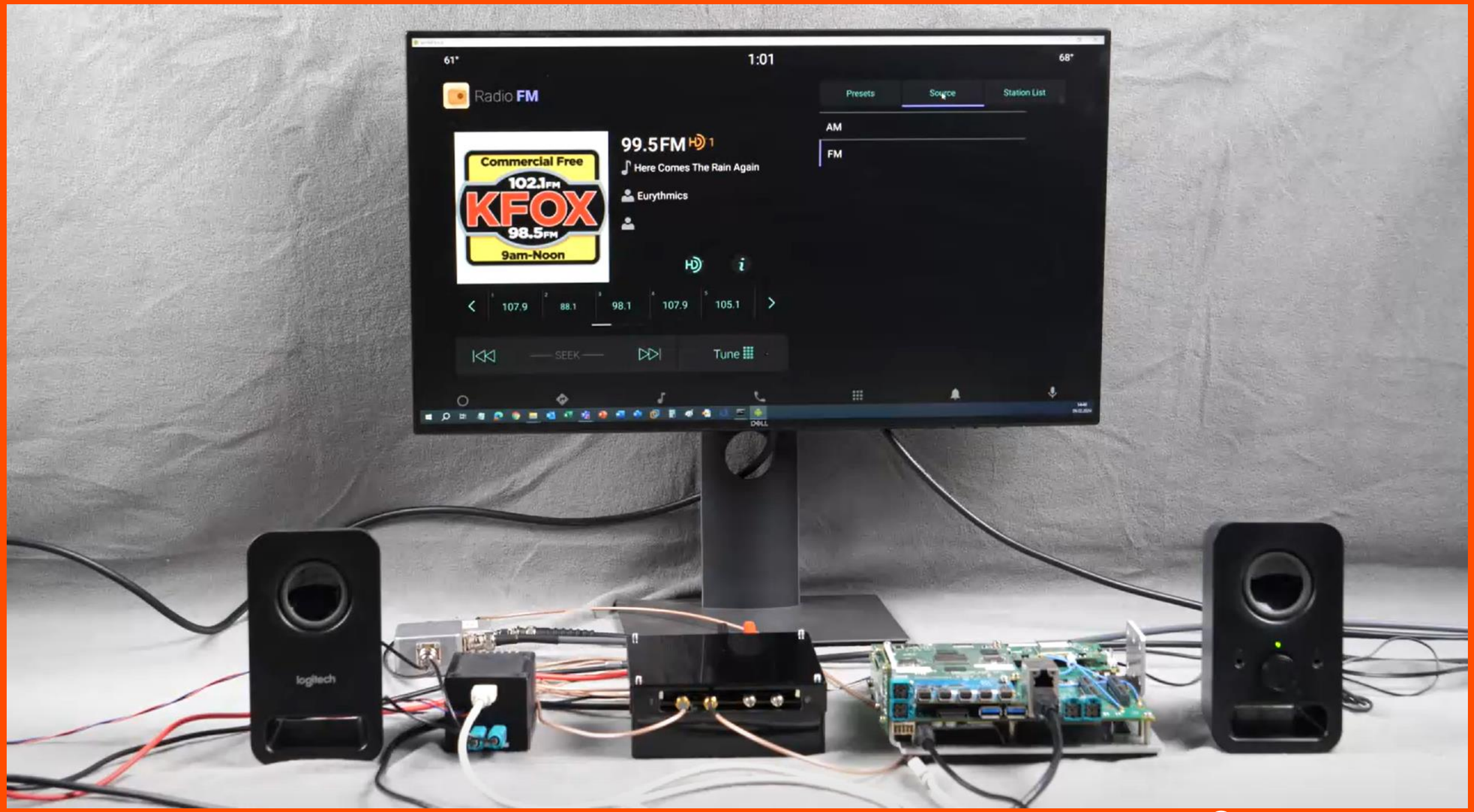
- Qualcomm SA8155
- Android Automotive OS
- Linux

Tuner SoC

- USB Tuner using NXP Mercury/Radion
- USB Tuner using Skyworks Falcon/Dual Eagle



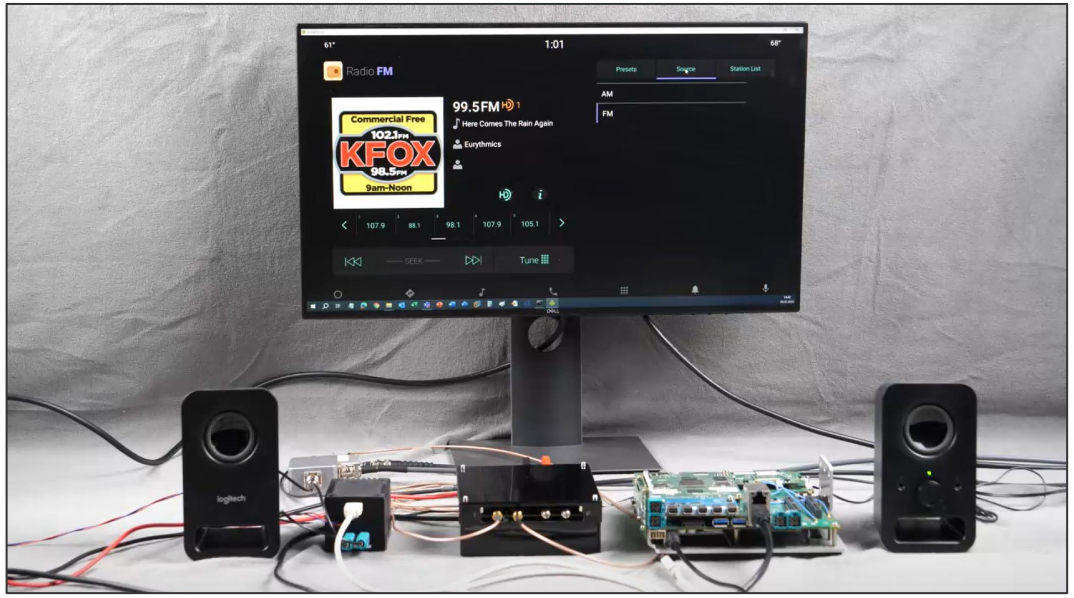




During the live session, a demo is shown in which the ADP board is running an Android Broadcast Radio App using both the NXP and Skyworks based USB Tuner available with Radio Tuner SDK interchangeably. This text replaces the demo in the PDF version for technical reasons.

Thank you for your understanding.

Demonstration Summary



- Accelerating time-to-market with Radio Tuner SDK over USB
- Radio Tuner SDK highly abstracted to run in a virtualized environment
- Seamless integration with the Android Automotive OS, Linux and QNX
- The Radio Tuner SDK operates hardware-agnostic, ensuring consistent quality independent of the car model, geographical location, or hardware generations.

Radio Tuner SDK now with USB

A software radio component for automotive infotainment systems

- Supports different broadcast standards worldwide
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Thank You

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Merci
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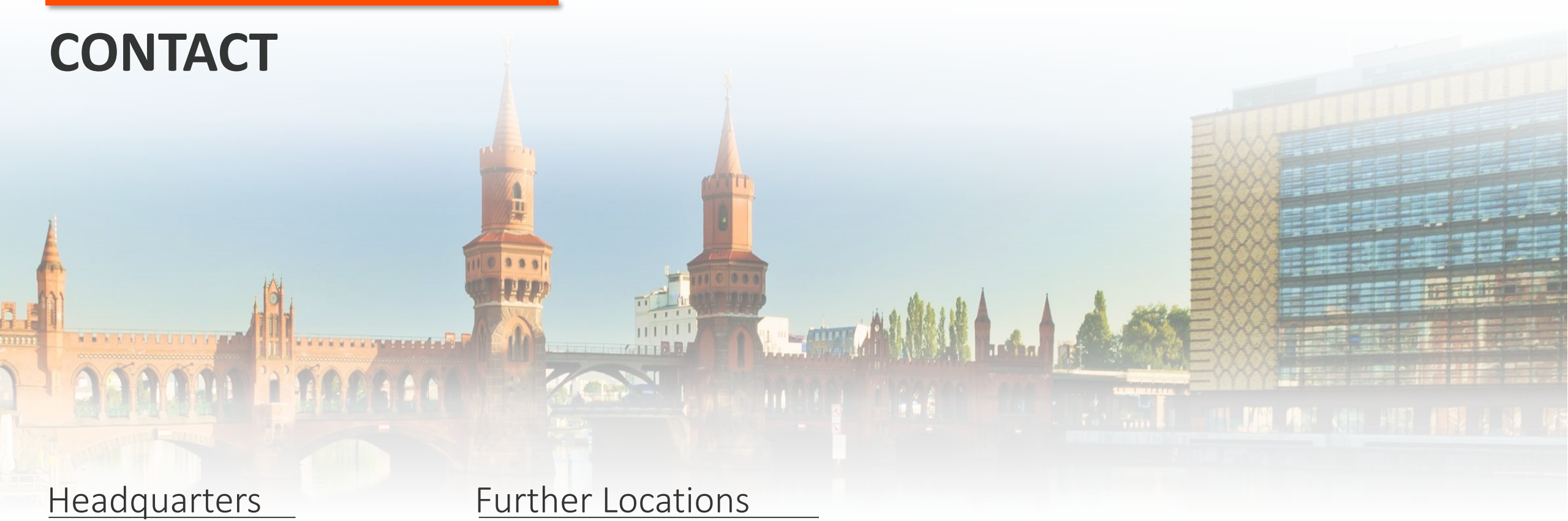
CONTACT



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