

Agilex eSOMxC based 5G/Wireless Development Platform



Agilex® SOM Products Summary

- Embedded SOM (eSOM™) product line with Agilex® 7 and Agilex® 5 series FPGAs

#	Module	Series, Pkg, Tiles (XVR)	Size, Connectors	Protos	Production
1‡	eSOM7-2F	7F-Series, R24C, 2xF Tiles	120x120mm, Dual 400 pin connectors	-	Now
2‡	eSOM7-4F	7F/7I/7M-Series, R31B/C, 4xF Tiles	120x140mm, Dual 400 pin connectors	Q3, 2025	Q4, 2025
3*	eSOM7C-xF	7F-Series, R24C (2xF) and 24D (1xF)	95x110mm, Single 400 pin connector	-	Now
4*	eSOM5C-Ex	5E B Series, B32A, 24x 17G	82.5x110mm, Single 400 pin connector	Now	Q1, 2026
		5E A Series, B32A, 24x 28G	82.5x110mm, Single 400 pin connector	-	Q1, 2026
5*	eSOM5C-D	5D Series, B32A, 32x 28G	82.5x110mm, Single 400 pin connector	Now	Q4, 2026
6	eSOM5μ-Ex	5E B Series, B23A, 12x 17G	60x60mm, Dual 200 pin connectors	Q3, 2025	Q4, 2025
		5E A Series, B23A, 12x 28G	60x60mm, Dual 200 pin connectors	Q3, 2025	Q1, 2026

‡ Pin compatible/inter-changeable eSOMs

* Pin compatible/inter-changeable eSOMCs



eSOMxC Modules

(eSOM7C-xF, eSOM5C-Ex)



eSOMxC - Migration Across Agilex Device Families

FPGA Migration - The Easy Way

eSOM7C-xF

- Agilex®7 F Series • 24C/24D package
- 32/16 transceivers • 600K to 2.7 million LEs



eSOM5C-Ex / eSOM5C-D

- Agilex®5 EB/EA/D Series • B32A Package
- Up to 32 transceivers • 100K - 650k LEs



K-2 Socket

- Interchangeable eSOMxC modules
Agilex®7 and Agilex®5 series

- Up to 32 XCVRs, 56PAM4/32.5 NRZ

- 12 True Diff and 6 Clock I/O

- HPS GiGE, SPI, I2C, UART

- Telemetry and Control

- 42 SE 1.2V I/O

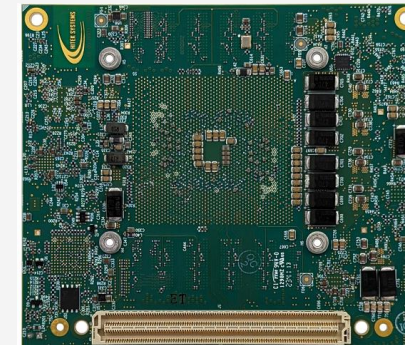
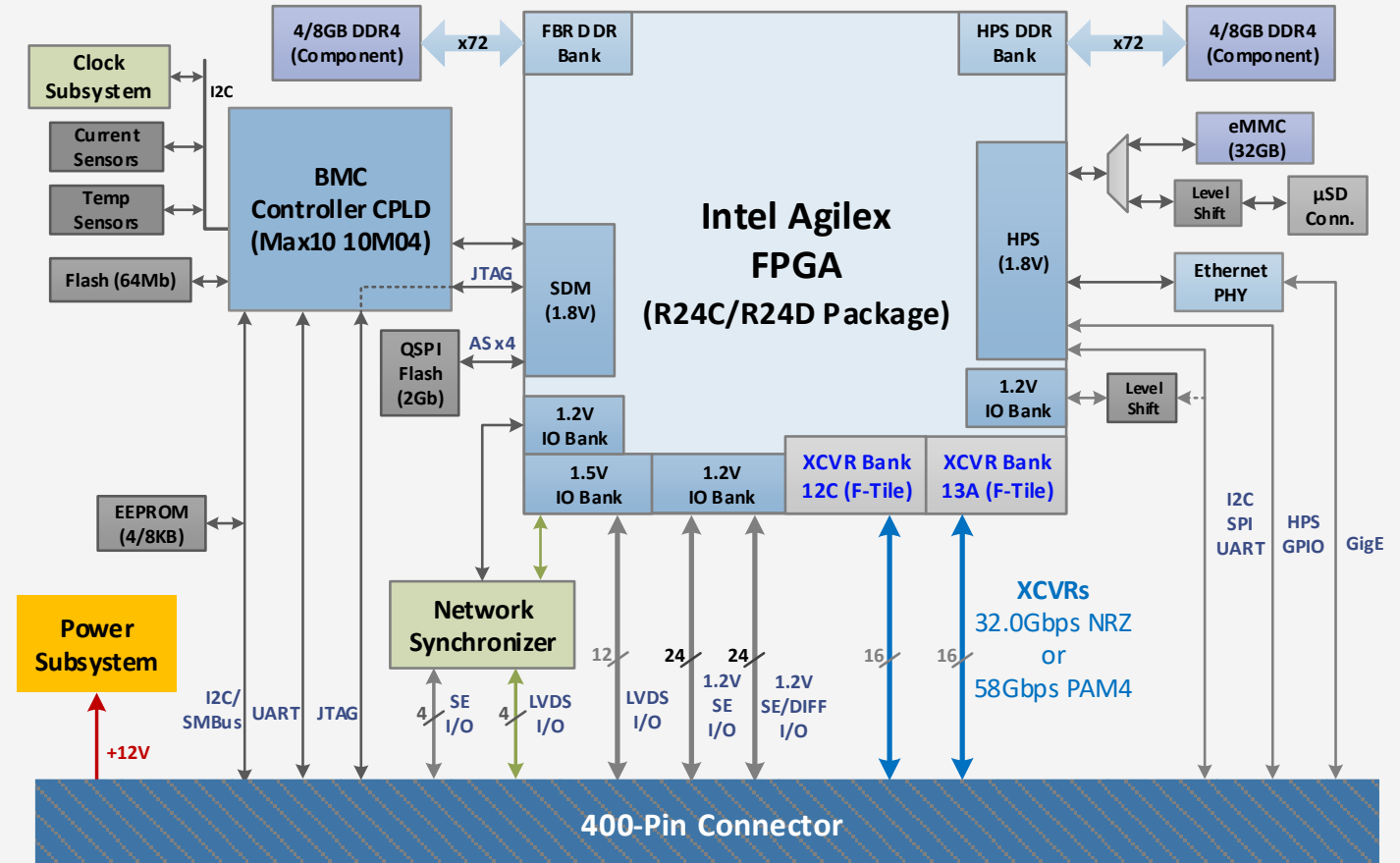
- 12V Power

100k to
2.7M LEs



Agilex eSOM7C-xF (Compact) Module

- 95mm x 110mm (3.75" x 4.33" approx.) form factor embedded System on Module (eSOM) with Intel Agilex™ 7 Series FPGA
- Supports all devices in R24C 2x F-Tile package: **027/022, 023/019, 014/012 and 008/006**
- Supports **R24D** package **1x F-Tile** devices with 014/012 and 008/006 density
- **Industrial temp design, -40C to 85C**
- Single 400-pin high performance connector with Serdes, IOs and power. 5mm and 10mm stacked height options.
- Leverages eSOM7-2F development, hardware, firmware and software. BSP compatible with eSOM-2F modules.
- *Paired with COTS and custom carriers (Hitek or customer developed) for a quick time to market solutions*



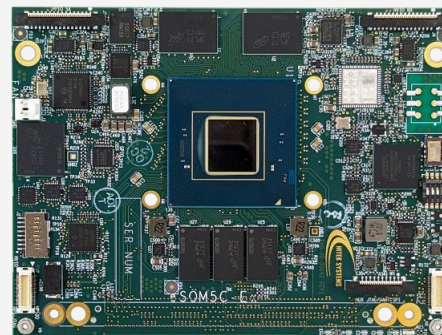
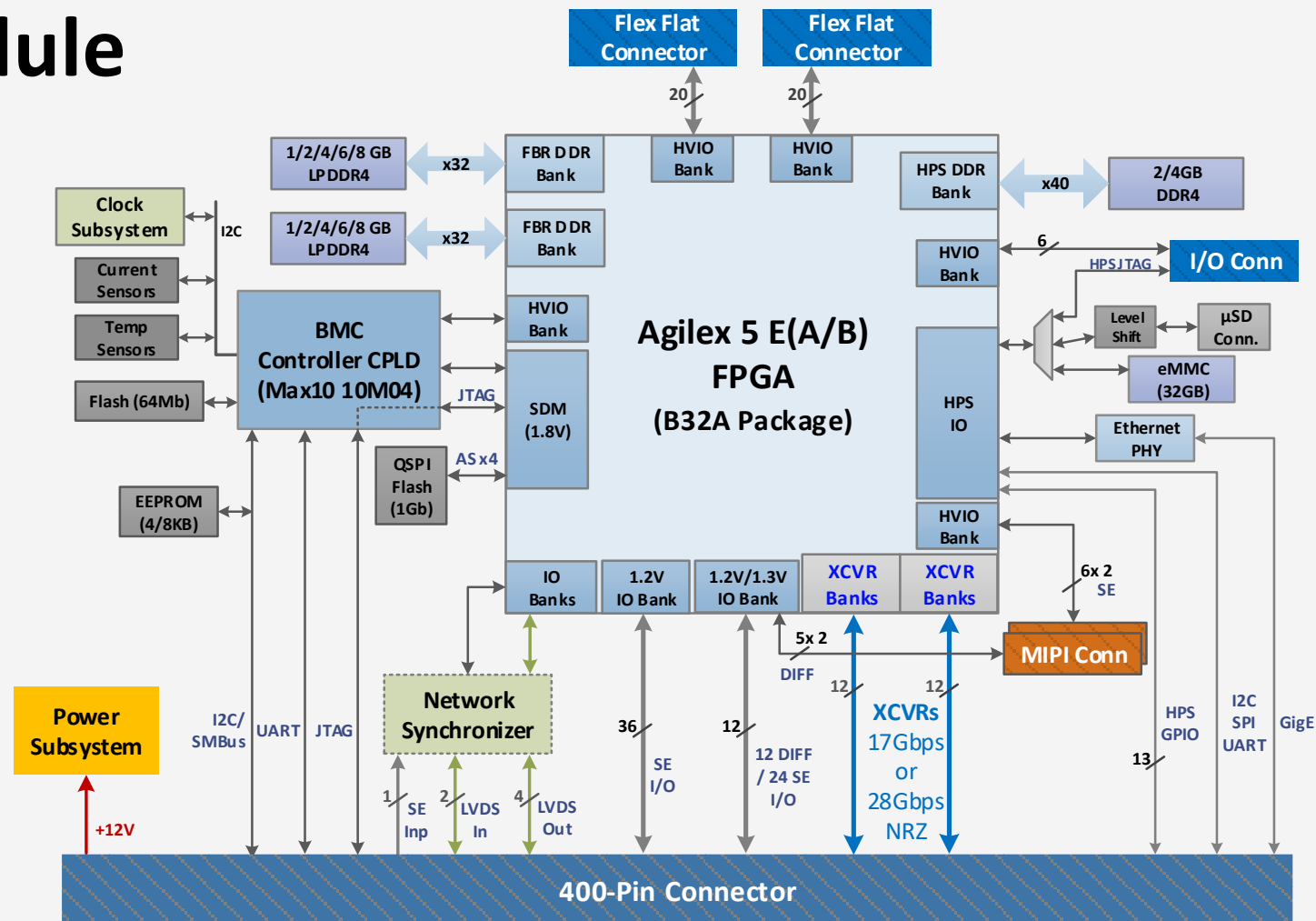
Agilex eSOM7C-xF Module - Features

- ARM A53 processing complex (HPS) with 4/8GB 72-bit component DDR4 memory, 16/32GB eMMC and μ SD card, GiGE Ethernet, SPI, I2C and UART interfaces
- FPGA fabric memory: 2 banks of 72-bit 4/8GB component DDR4 memories, 2GB SDM QSPI for FPGA image
- Integrated Skyworks Si5518 based network synchronizer for high performance PTP/1588 through Intel Qulsar or Skyworks AccuTime Linux PTP software stack
- Stratum 3 class on-board TCXO clock reference with stuffing option for OCXO
- One 400-pin interface connector
 - F-Tile based Serdes interface; 32 NRZ (32Gbps) or 24 PAM4 (58.125Gbps) transceivers
 - Fabric side true-differential (LVDS), 1.2V differential, 1.2V single-ended GPIO for control, interface and clock management
 - HPS Interfaces: Ethernet (1000Base-T/MDI), UART, I2C, SPI and extra GPIO or extra UART/I2C/SPI
 - BMC Interfaces: UART, I2C, board control I/O and telemetry
 - Single +12V power input
- Debug support: FPGA JTAG access, console access to HPS, UART and I2C interfaces to BMC FPGA, extensive temperature and voltage sensors for board telemetry
- Up to 120A core rail supply using multi-phase controller and DrMOS power stages
- Extensive firmware and software support packages, fully compatible with eSOM7-2F
 - Complete Linux FPGA support package
 - Comprehensive APIs for board management



Agilex eSOM5C-Ex Module

- 82.5mm x 110mm (3.25" x 4.33" approx.) form factor embedded System on Module (eSOM) with Intel Agilex 5 E Series A/B FPGA
- Designed and PCB layout to support B32A package for both A5E0xxA and A5E0xxB devices
- 24 transceivers routed to interface connector
- Industrial temp design: -40C to 85C**
- One 400-pin high performance connectors with Serdes and IOs. 5mm and 10mm stacked height options.
- Fully pin/drop-in compatible with Agilex7 eSOM7C-xF module**
- Can be paired with COTS (eSOMxC carriers) and custom carriers (Hitek or customer developed) for very quick time to market solutions



Agilex eSOM5C-Ex Module - Features

- Enhanced Agilex5 processing complex (HPS) with 2/4GB 32-bit DDR4 memory, 16/32GB eMMC/μSD card, GiGE Ethernet, SPI, I2C and UART interfaces, 13 HPS signals routed to carrier (can support USB2.0/3.0 interface)
- FPGA fabric memory: Two 32-bit 1/2/4/6GB LPDDR4 memories, 1GB SDM QSPI for FPGA image
- One 400-pin connector
 - 24x 17Gbps (Group B) or 28Gbps (Group A) transceivers
 - Fabric side true-differential (LVDS), 1.3V/1.2V differential, 1.2V single-ended GPIO for control, interface and clock management
 - HPS Interfaces: Ethernet (1000Base-T/MDI) and 18-20 HPS GPIO for USB/UART/I2C/SPI
 - BMC Interfaces: UART, I2C, board control I/O and telemetry
 - Single +12V power input
- Two 30 pin flex-flat ribbon cable connectors for low speed 1.8V/2.5V/3.3V HVIO signals
- Two 30-pin onboard expansion connectors, mapped for MIPI interface
- Integrated Skyworks Si5518 based network synchronizer for high performance PTP/1588 through Intel Qulsar or Skyworks AccuTime Linux PTP software stack
- Stratum 3 class on-board TCXO clock reference with stuffing option for OCXO
- Programmable clock generator for DDR4/LPDDR4 and local XVR reference clocks
- Debug support: FPGA JTAG access, console access to HPS, UART and I2C interfaces to BMC FPGA, extensive temperature and voltage sensors for board telemetry



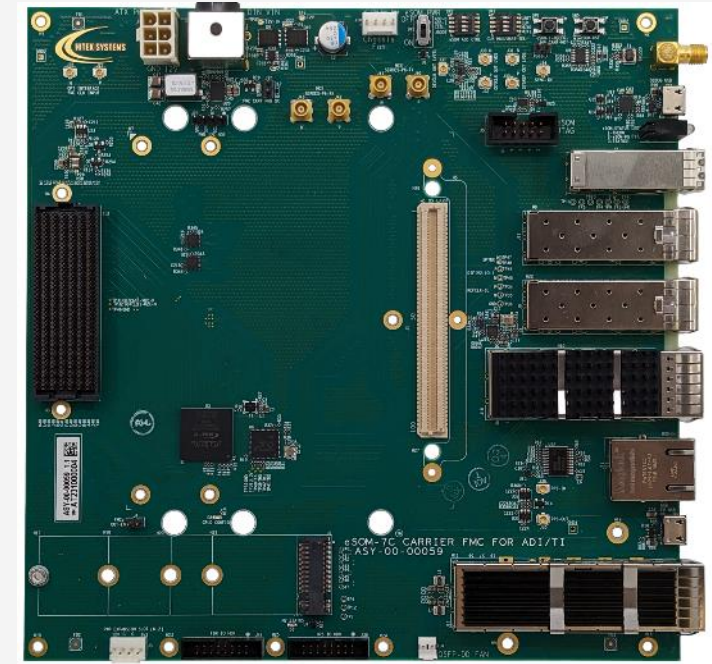
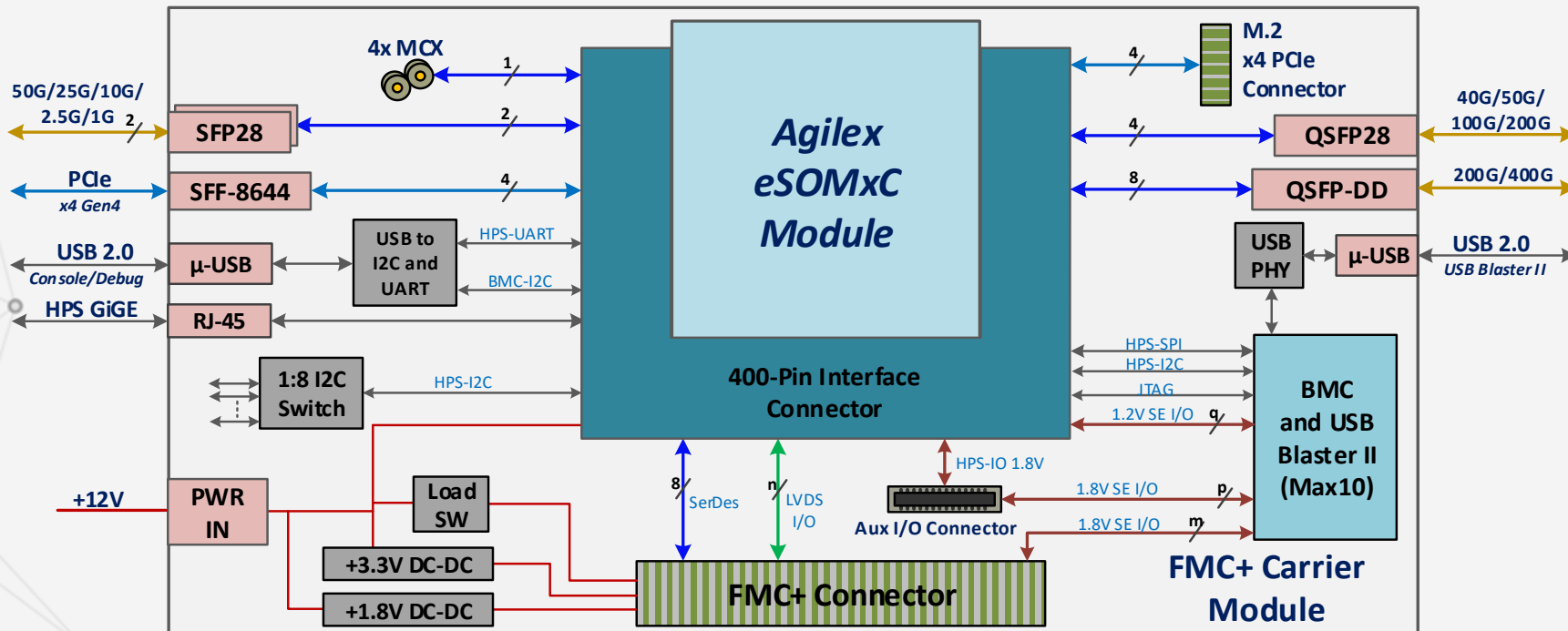
eSOMxC Wireless/5G Development Platform

(eSOM7C-xF, eSOM5C-Ex)



eSOMxC FMC+ Wireless/Networking Carrier

- 190mm x 190mm (7.5" x 7.5" approx.) carrier for Agilex 7 eSOM7C-xF and Agilex 5 eSOM5C-E/D FPGA modules
- Designed to provide end-to-end 5G, wireless and satellite-Hub development platform for latest ADI, and TI RF transceivers
- Flexible FMC+ I/O and clocking for use with other compatible video and camera interface FMC/FMC+ modules



eSOMxC Wireless/Networking Development Platforms



Common
Carrier

eSOM7C-xF



eSOM5C-Ex



eSOM5C-D

2026

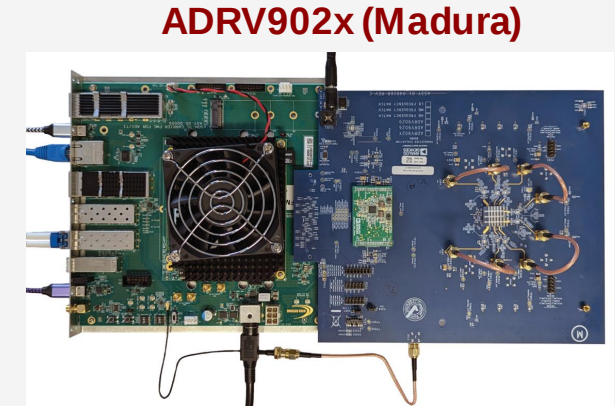


eSOM7C 5G/Wireless Devkits Support

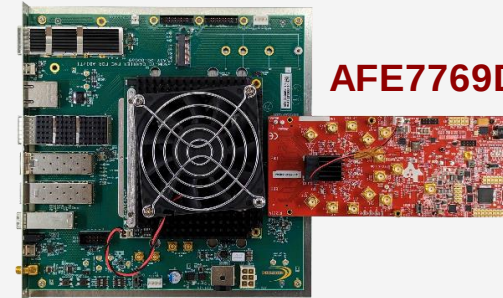
- 5G/Wireless platform for **Analog Devices** RF XCVR Devkits
 - Ordering Code: **AGP-01-eSOM7C-1B7-05-02**
 - Supported ADI Development Kits:
 - ADRV904x (Koror) - **Demo available**
 - ADRV902x (Madura) - **Demo available**
 - AD9081/9082/9986/9988 MxFEs - **Demo available (AD9081)**
 - AD9208/AD9689/AD6688 ADCs
- 5G/Wireless platform for **Texas Instrument** RF XCVR Devkits
 - Ordering Code: **AGP-03-eSOM7C-1B7-05-02**
 - Supported TI Development Kits:
 - AFE77xx (AFE7769D, AFE7769, AFE7799) - **Demo available (AFE7769D)**
 - AFE79xx (AFE7900, AFE7989/88, AFE7920/21, AFE7952)
 - AFE80xx (AFE8092, AFE8030x, AFE802x) - **Demo available (AFE8092)**
 - DAC39RF10, DAC39RF12 - **Demo available (DAC39RF12)**



AD9081 MxFE



ADRV902x (Madura)

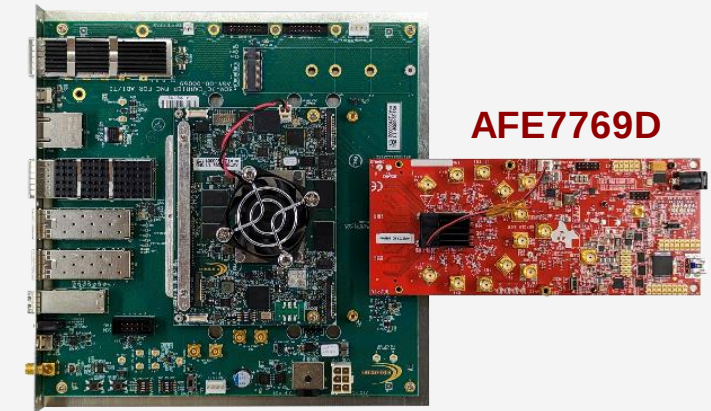


AFE7769D

Note: Default platforms with eSOM7C SKU **AG-eSOM7C-1B7-05-02**; Module with AGFB027R24C2E2VB FPGA, HPS, -2 speed XVR, -2 core speed, Extended Temp, VID Power, 2x 4GB DDR4, 16GB eMMC

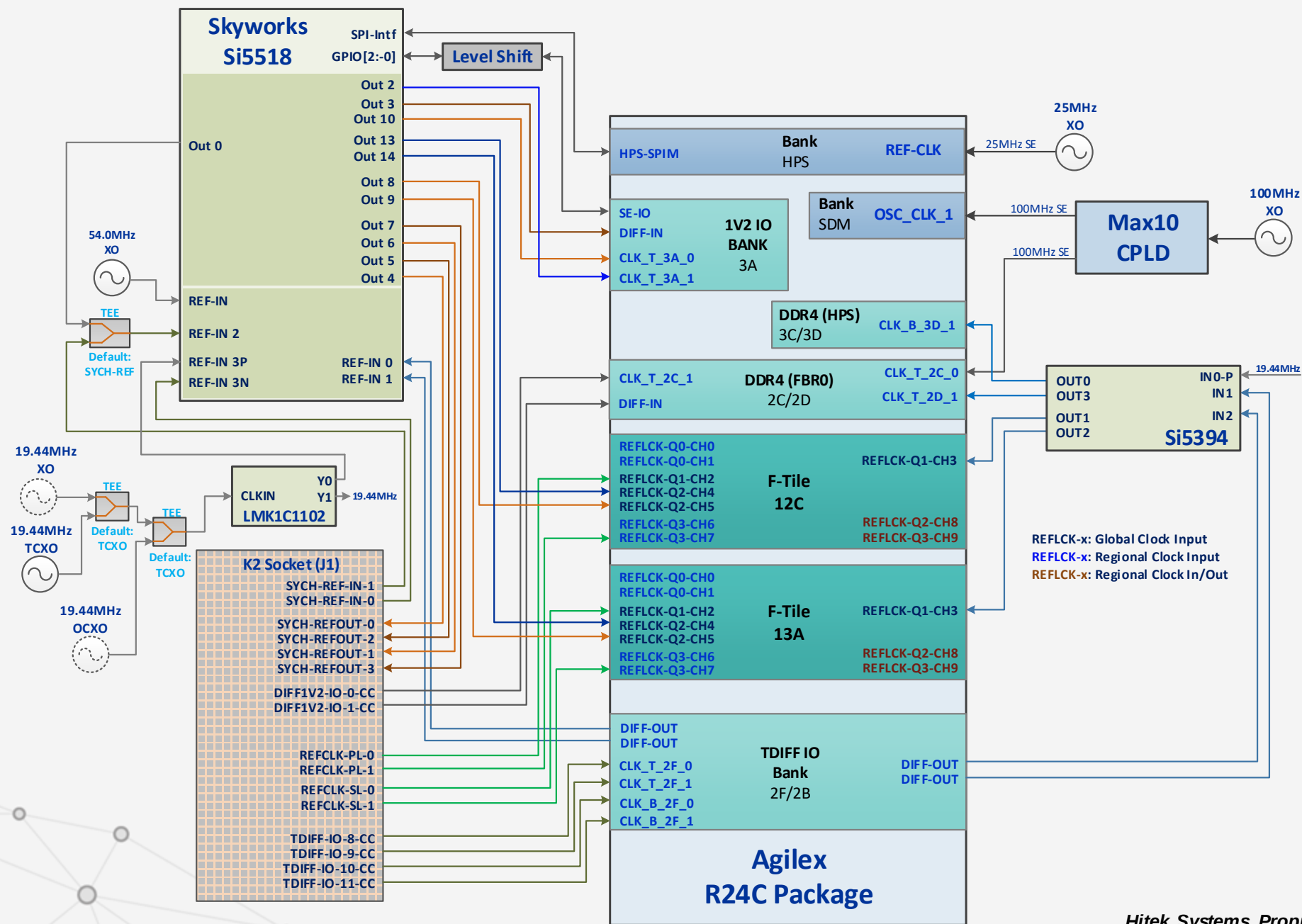
eSOM5C 5G/Wireless Devkits Support

- 5G/Wireless platform for **Analog Devices** RF XCVR Devkits
 - Ordering Code: **AGP-01-eSOM5C-EA7-01-02**
 - Development Kits:
 - ADRV904x (Koror)
 - ADRV902x (Madura)
 - AD9081/9082/9986/9988 MxFEs
 - AD9208/AD9689/AD6688 ADCs
- 5G/Wireless platform for **Texas Instrument** RF XCVR Devkits
 - Ordering Code: **AGP-03-eSOM5C-EA7-01-02**
 - Supported TI Development Kits:
 - AFE77xx (AFE7769D, AFE7769, AFE7799)
 - AFE79xx (AFE7900, AFE7989/88, AFE7920/21, AFE7952)
 - AFE80xx (AFE8092, AFE8030x, AFE802x)

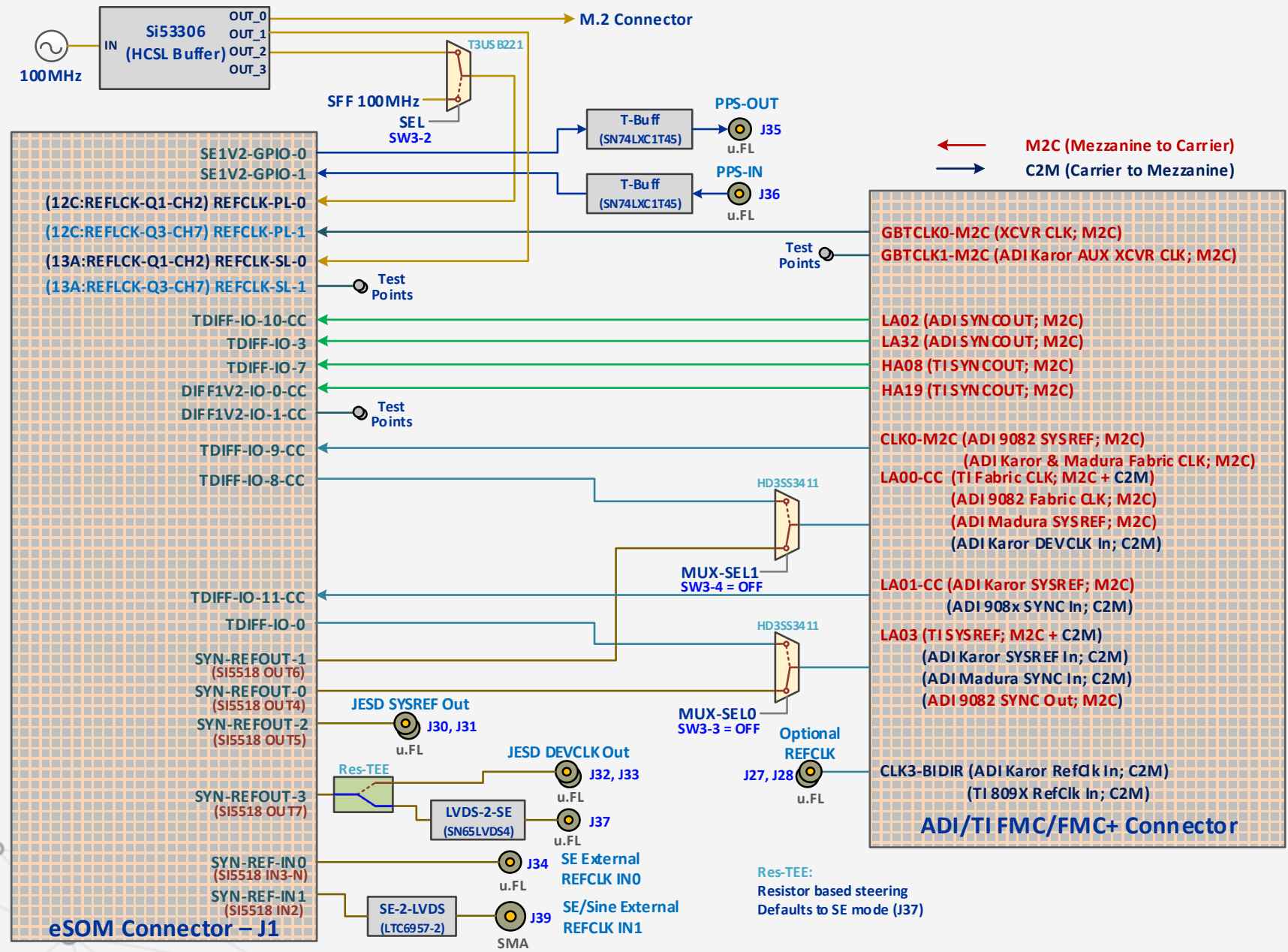


Note: Default 5G platforms with eSOM5C SKU **AG-eSOM5C-EA7-01-02**; Module with A5ED65BB32AE4SR0 ES0 FPGA, HPS, -2 speed XVR, -2 core speed, Industrial Temp, 2GB HPS DDR4, 2 banks of 1GB LPDDR4, integrated Skyworks Si5518 network synchronizer

eSOM7C-xF Clock Tree Diagram



5G/Wireless Carrier - Clock Tree Diagram



eSOM7 ORAN Development Framework (Optional, Licensed Separately)

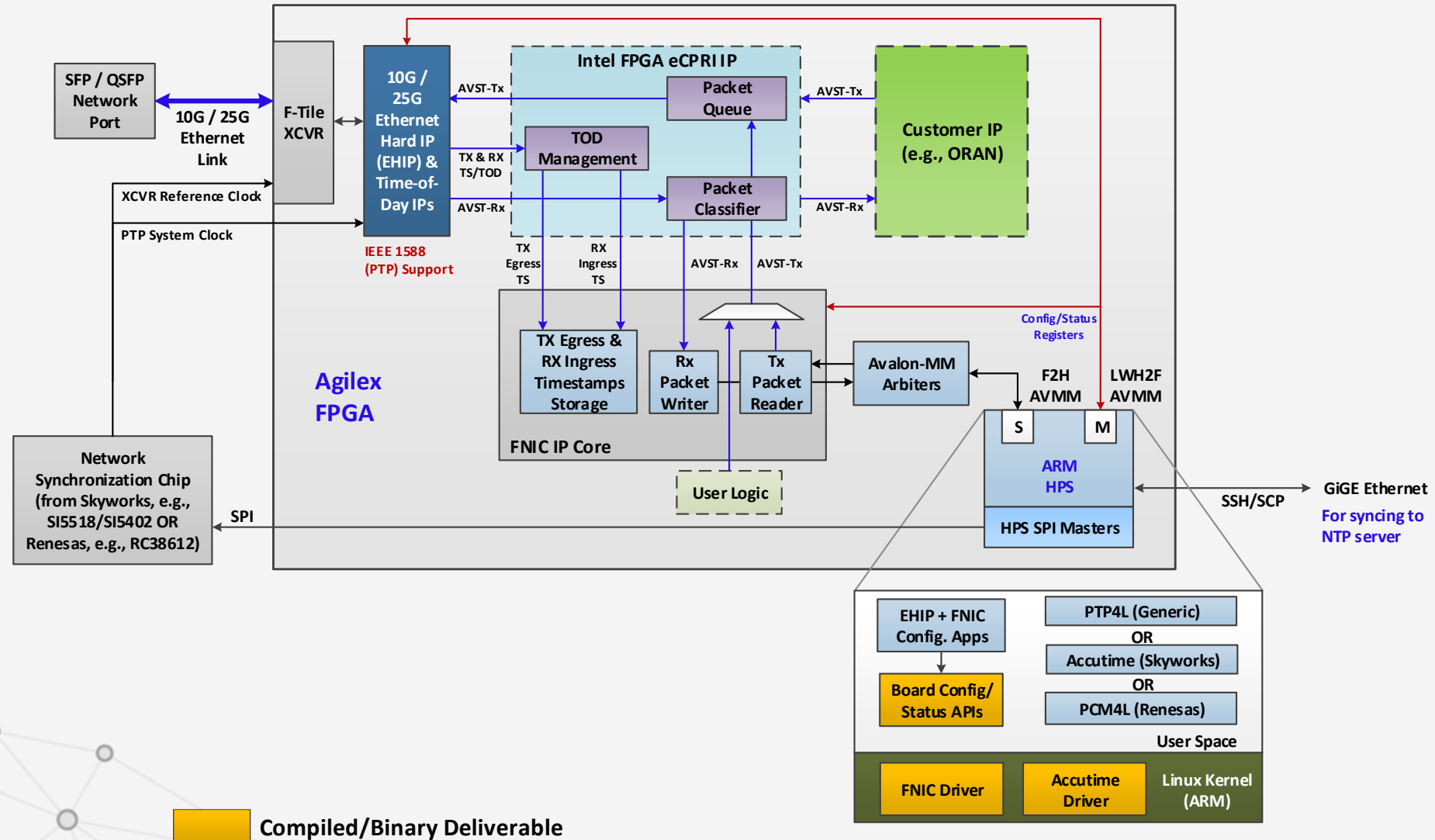


- RF interface framework for integrating JESD204C RF transceiver/devkits
- Network interface framework integrating ORAN front haul blocks



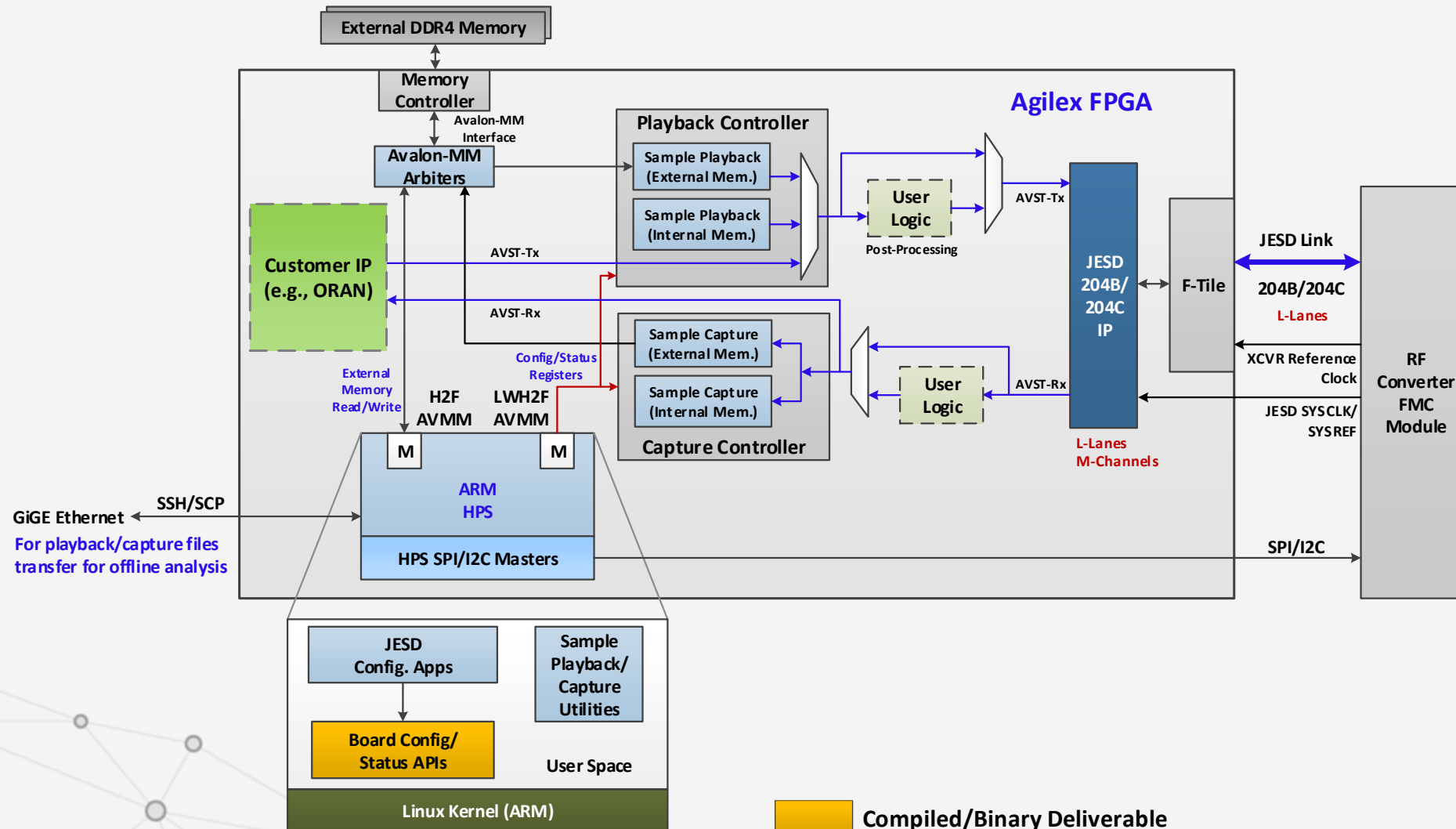
Network Interface Framework

- Integrated and hardware verified framework for front haul 25Gbps network interface
- Integrates 25Gbps F-tile Ethernet hard-IP, Intel eCPRI IP and networking interface for 1588/PTP and control packets



RF Interface Framework

- Integrated and hardware verified framework for RF-XVR/ADC/DAC devkits from ADI, MaxLinear and TI
- Integrates JED204C Intel FPGA IP (F-Tile) with JESD link verification and sample payback/capture logic

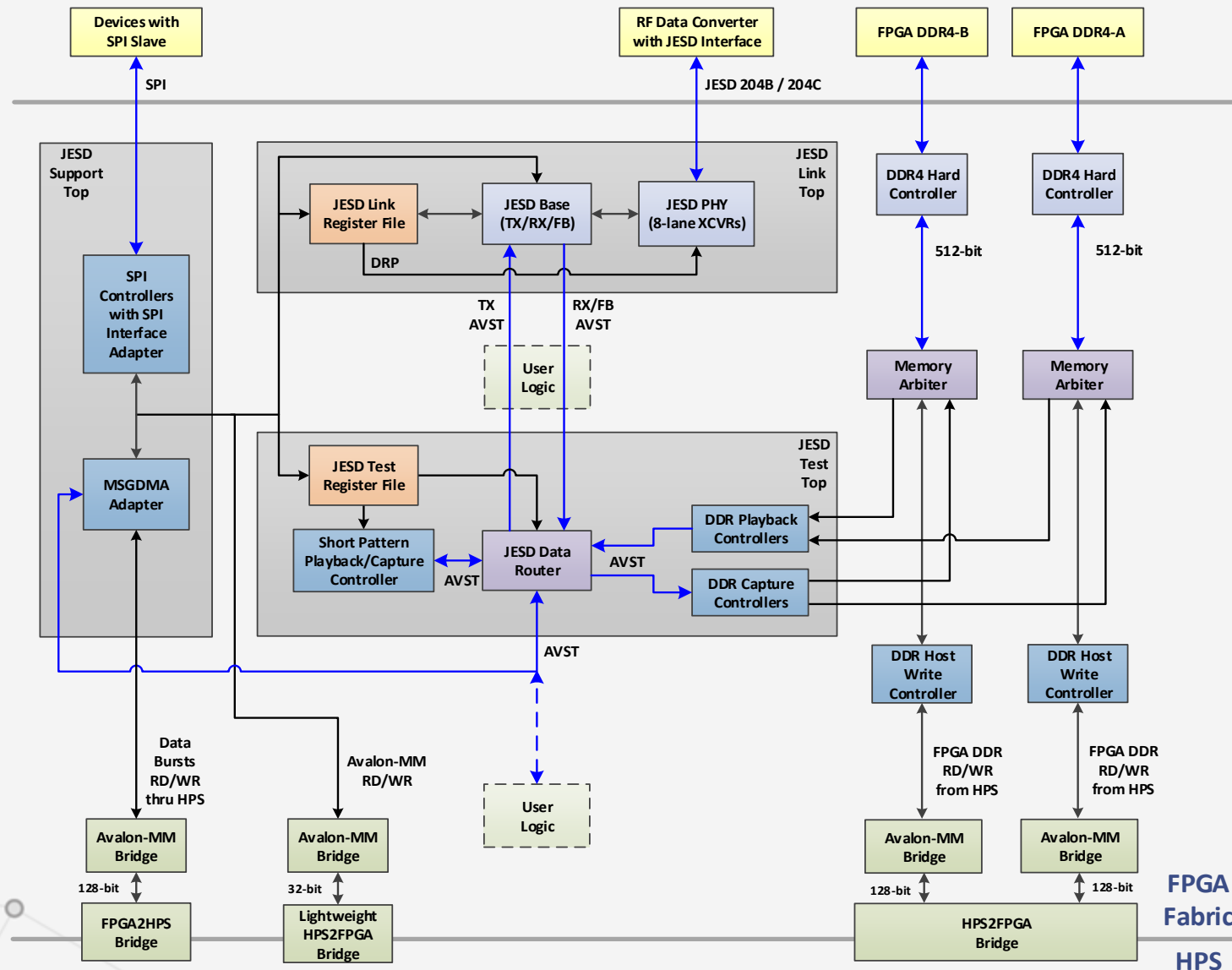


Agilex FPGA RF Interface Framework – Features

- Integrated JED204C Intel FPGA IP (with F-Tile) configured for supported RF-XVR/ADC/DAC devkits
- N-Channel (up to 8) Playback Controller with support for samples playback from FPGA internal memory or external DDR4 memory
- N-Channel (up to 8) Capture Controller with support for samples capture in FPGA internal memory or deep captures in external DDR4 memory
- Multiplexing logic for user custom pre-processing and post-processing logic at JESD Tx (DAC) path
- Multiplexing logic for sample capture at JESD Rx interface before or after user custom processing in ADC path
- External memory controller and Avalon-MM Arbitration
- Avalon-MM slave and Address decoder for configuration/status registers on HPS LWH2F interface
- Avalon-MM HPS H2F interface for burst read/write access to external memory (for sample playback/capture files)
- ARM HPS (Hard Processing Subsystem) with Linux support
- Software utilities and tools for sample playback and capture support



RF Interface Framework Connectivity



RF Interface Framework Deliverables

- Agilex FPGA Design
 - HPS platform designer subsystem with HPS-FPGA interfaces
 - JESD204B/JESD204C Intel IP integration to top level (customer needs to get JESD IP core license from Intel)
 - DAC playback controller and multiplexing logic RTL source
 - ADC capture controller and multiplexing logic RTL source
 - External Memory Controller and Avalon-MM peripherals
- User Space Tools/APIs
 - Complete HPS ARM BSP with U-boot, Linux kernel and eMMC filesystem
 - User space application and tools for configuration/initialization and playback/capture tests.
 - Top level example bash scripts to demonstrate configuration sequence and running DAC/ADC tests
- FPGA registers ICD and API/tools documentation



Deliverables Matrix - 1 of 2

- BSP provided for eSOM7 for development
- RF/JESD interface demos provided for ADI, MaxLinear and TI RF XVR development kits
- Optional licensed RF Interface framework supporting RF XVRs from ADI, MaxLinear and TI

Type	Parts	eSOM BSP & Demos	RF Intf. Framework
RTL/IP (Intel)	Intel HPS IP	Yes	Yes
	Intel EMIF IP	Yes	Yes
	Intel XCVR IP	Yes	Yes
	Intel SPI Master IP	Yes	Yes
	Intel Mailbox Client IP	Yes	Yes
	Intel JESD IP, .IP files *	Yes *	Yes *
ARM BSP	U-Boot Build Script and compiled image	Yes	Yes
	Linux Kernel/DT build script and compiled Image	Yes	Yes
	rootfs build script and compiled .ext3 Image	Yes	Yes
ARM Applications	APIs	Compiled (C-Lib) ‡	Compiled (C-Lib) ‡
	Tools for BSP-Lite (SPI, Telemetry)	Source	Source
	Tools for EMIF+XCVR BIST	Compiled Only	Source
	Build Scripts	Yes	Yes
x86 Applications	Tools for BSP-Lite (Telemetry through USB/I2C)	Yes	Yes
Quartus Projects	.qsf quartus settings file .sdc timing constraints HPS/Flash image generation scripts	BSP	BSP + RF Intf. Framework

* Intel's IP Core; Requires licensing from Intel

‡ Source code licensing options available

Hitek Systems Proprietary



Deliverable Matrix – 2 of 2

Type	Parts	eSOM BSP & Demos	RF Intf. Framework
RTL/IP (Hitek)	I2C Master	Encrypted RTL ‡	Encrypted RTL ‡
	Extensible AVMM interconnect	FPGA Bit image only	Encrypted RTL ‡
	Transport Layer PRBS Generator	FPGA Bit image only	Encrypted RTL
	In-system XCVR Config. (PRBS Gen/Chk, Polarity)	FPGA Bit image only	Source
	EMIF BIST	FPGA Bit image only	Source
RF XVR/JESD Interface	<i>RF XVR devkit and JESD interface Demos</i>	<i>FPGA Bit images only</i>	<i>Source</i>
	RTL: F-Tile JESD top level IP Wrapper	Demo specific configuration only	Support for multiple LMFS configurations
	RTL: Sample Playback and Capture (Internal RAM)	FPGA Bit image only	Source
	RTL: Sample Playback and Capture (External DDR)	FPGA Bit image only	Source
	ARM App: Tools for RF Interface Framework	Compiled Only	Source
	x86 App: Captured Samples Analysis and plotting Tools	Executable Only	Source
	x86 App: Captured Samples FFT and plotting Tool	Executable Only	Source
Documentation	API Documentation	Yes	Yes
	Bringup Notes	Yes	Yes
	BSP User Guide	Yes	Yes
	FPGA User Guide	Yes	Yes
	HW User Guide	Yes	Yes
	MXL/TI/ADI Carrier Quick Reference Guide	Yes	Yes
	RF XCVR (Mxl/TI/ADI) Interop. Test Results	Yes	Yes
	RF XCVR (MXL/TI/ADI) Devkit Demo Bringup Notes	Yes	Yes
	RF Intf. Framework User Guide	No	Yes
Cost		Included with eSOM	Contact Hitek for Licensing options and pricing

‡ Source code licensing options available

Hitek Systems Proprietary



TI Demo Summary

DevKit	Configuration	RefClk (MHz)	Sample Rate (MSPS)			Lane Rate (Gbps) L:M:F:S Configuration		
			Tx	Rx	Fb	Tx	Rx	Fb
AFE7769D	4T4R2F (24G)	368.64	737.28	368.64	737.28	24.33 4:8:4:1	24.33 2:8:8:1	24.33 2:4:4:1
	4T4R2F (16G)	245.76	491.52	245.76	491.52	16.22 4:8:4:1	16.22 2:8:8:1	16.22 2:4:4:1
AFE8092	8T8R	368.64 (FPGA) 491.52 (RF XVR)	737.28	737.28	-	24.33 8:16:4:1	24.33 8:16:4:1	-
	8T8R2F	368.64 (FPGA) 491.52 (RF XVR)	737.28	368.64	737.28	24.33 8:16:4:1	24.33 4:16:8:1	24.33 2:4:4:1
	4T8R2F	368.64 (FPGA) 491.52 (RF XVR)	1474.56	368.64	1474.56	24.33 8:8:2:1	24.33 4:16:8:1	24.33 4:4:2:1
DAC39RF12	2T	156.25 (FPGA) 10,000 (DAC)	1250	-	-	10.3125 8:4:2:2	-	-
	1T	156.25 (FPGA) 10,000 (DAC)	2500	-	-	10.3125 8:2:2:4	-	-

ADI Demo Summary

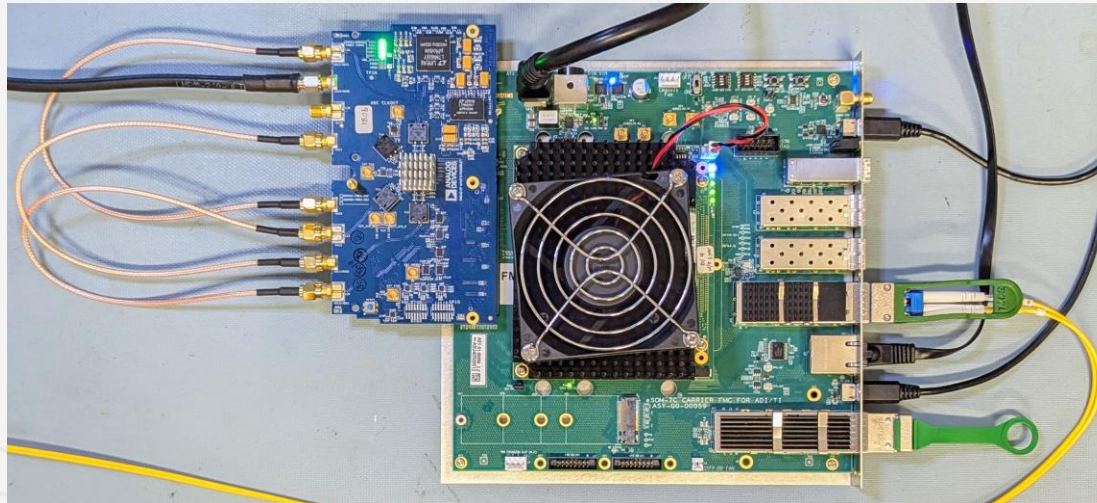
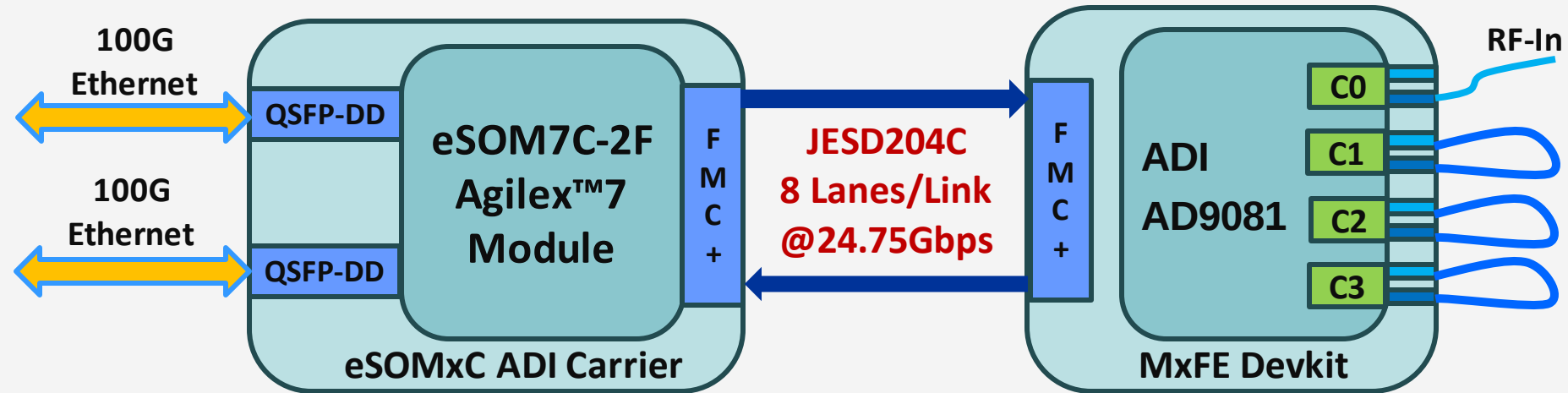
DevKit	Configuration	RefClk (MHz)	Sample Rate (MSPS)			Lane Rate (Gbps) L:M:F:S Configuration		
			Tx	Rx	ORx	Tx	Rx	ORx
ADRV9029	4T4R2O	122.88	491.52	245.76	491.52	16.22 4:8:4:1	16.22 2:8:8:1	16.22 2:4:4:1
ADRV9040	8T8R2O	122.88	491.52	245.76	491.52	16.22 8:16:4:1	16.22 4:16:8:1	16.22 2:4:4:1
AD9081	4CH 4T4R	375	1500	1500	-	24.75 8:8:2:1	24.75 8:8:2:1	-
	8CH 1T1R	375	750	750	-	24.75 8:16:4:1	24.75 8:16:4:1	-

eSOMxC Platform Solution Examples

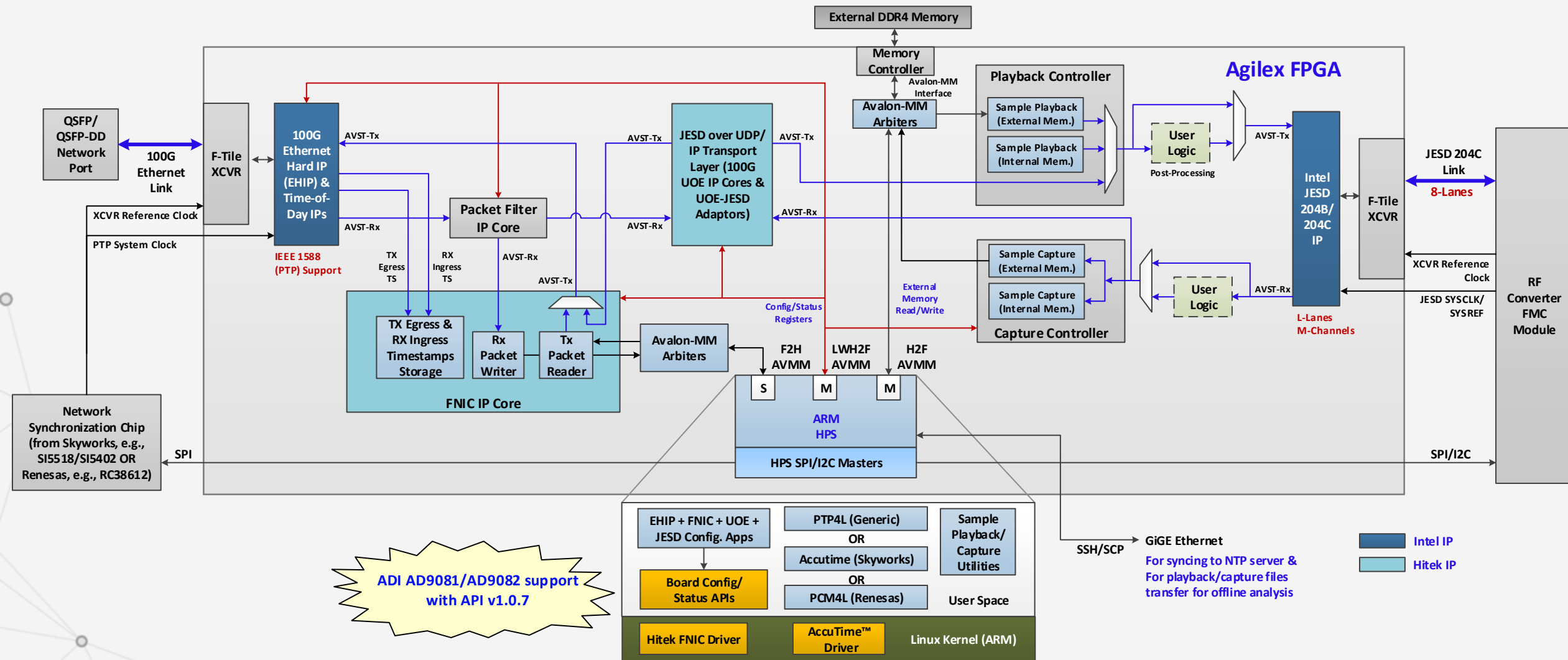


eSOM7C-2F + AD9081: I/Q over 2x 100Gbps Ethernet

- Hitek eSOM7C-2F Agilex 7 F series module with eSOMxC ADI wireless/networking carrier
- AD9081 MxFE devkit plugged into ADI carrier
- 4x channels of 1.5GSPS 32-bit I/Q (48Gbps per stream)
- 2x 100G fiber links each with two channels with VITA49/DIF1 packets over UDP/IP transport

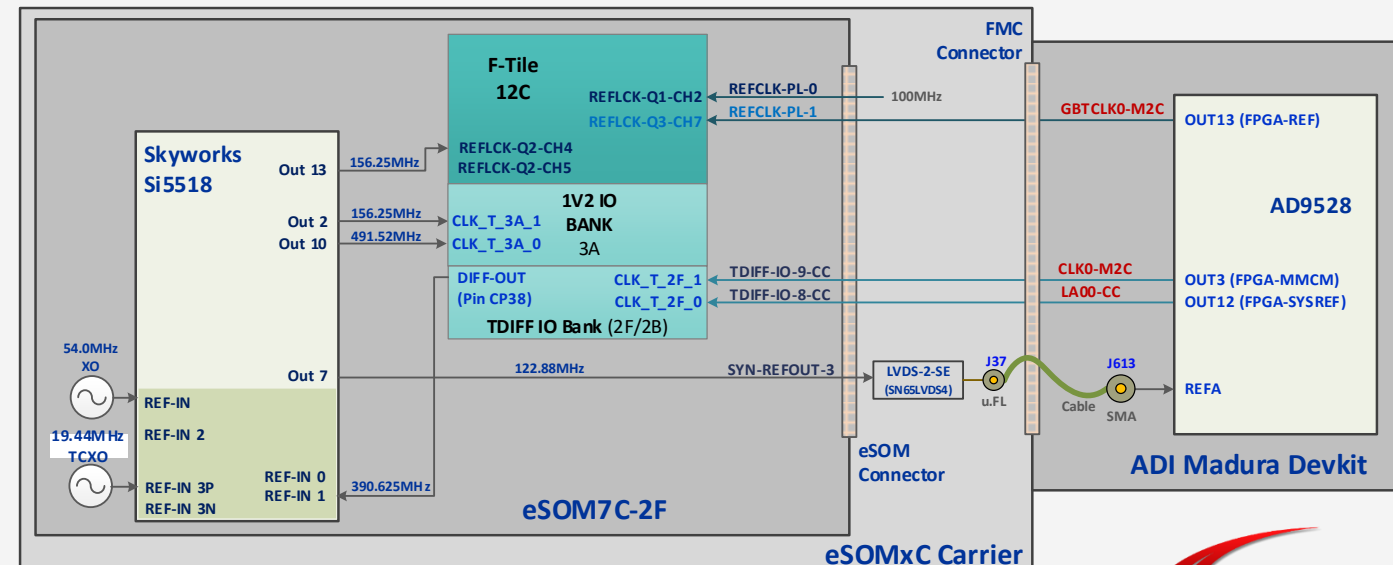


I/Q over 2x 100Gbps Ethernet - FPGA Block Diagram

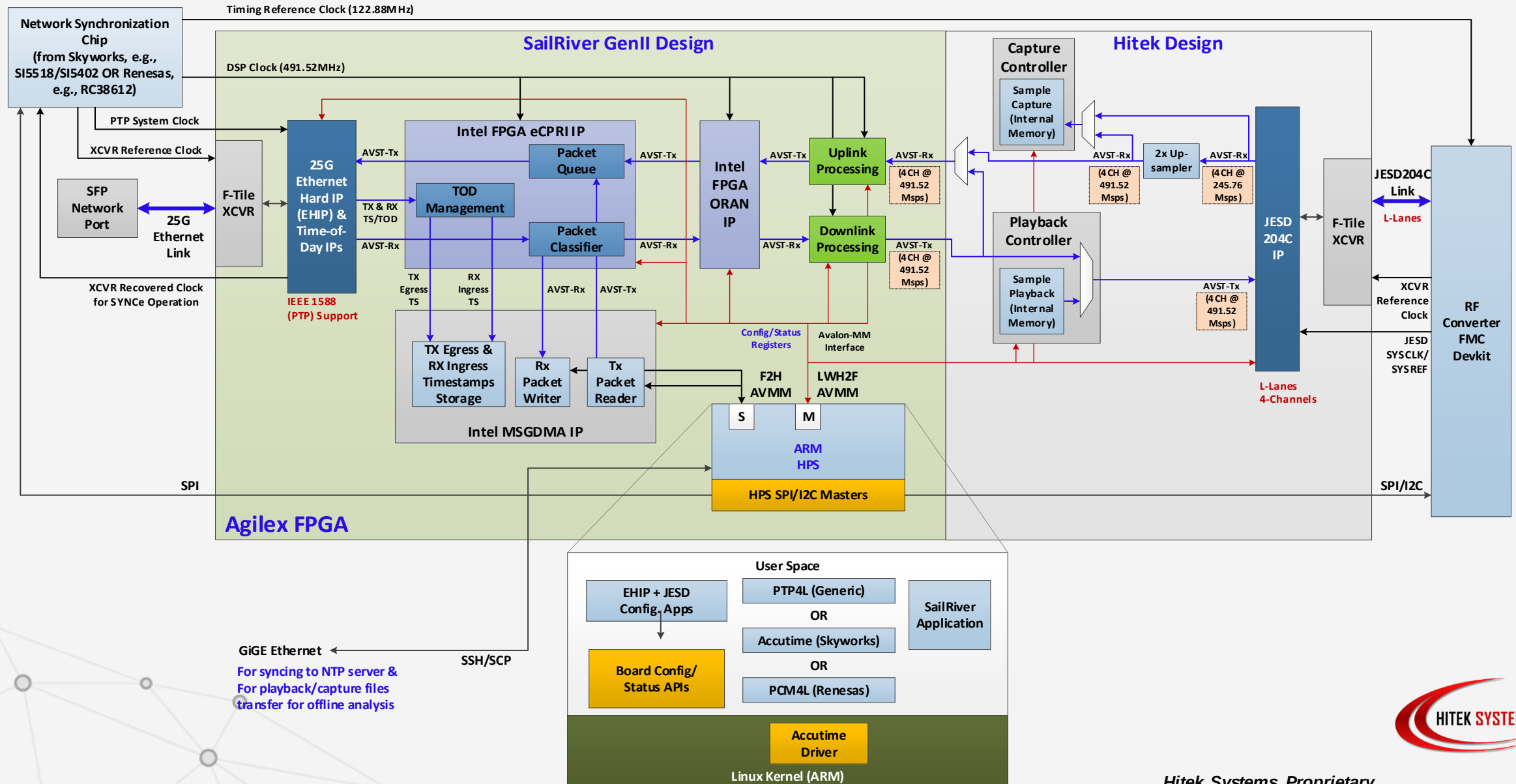


Integrated SR Gen2 on eSOM7C Platform

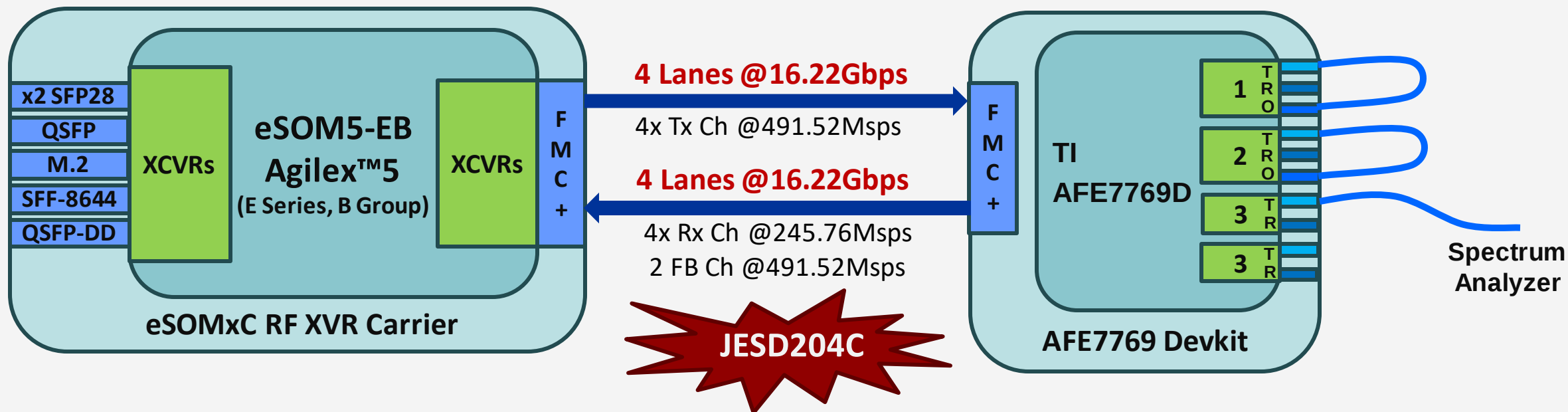
- Agilex Embedded SOM7-Compact (eSOM7C) mounted on eSOM7C ADI Carrier
- ADI ADRV902x (Madura) Evaluation Card mounted on FMC+ slot of eSOM7C ADI Carrier. Validation was performed with ADRV9029 Evaluation Card.
- Set up with 4x Tx and 4x Rx @ 491.52Msps from SR Gen2 IP
- Added up samplers in Rx path to up sample 245.76Msps Rx data from Madura devkit
- 25Gbps front haul network interface
- Network synchronization using integrated Si5518 synchronizer
- Pending end-to-end validation with ORAN Studio or equivalent*



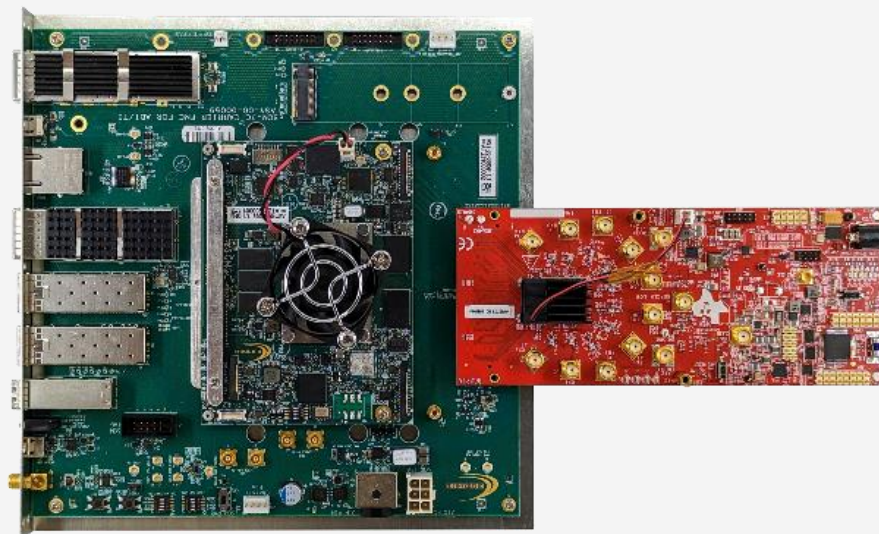
eSOM7C Setup for SR Gen2 – Block Diagram



JESD204C Interface on Agilex™ 5 E-Series FPGA



Hitek
eSOM5C-EB
+
eSOMx C RF XVR Carrier



TI
AFE7769D
Development Kit

