



A HERO ELECTRONIX VENTURE

## SMARC IQ-615 SOM Datasheet



## Document History

| Version | Date       | Changes        |
|---------|------------|----------------|
| V00.01  | 07/10/2026 | First Revision |

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## 1. Introduction

Tessolve has developed a reliable Qualcomm® Dragonwing™ IQ-615 based System-on-Module (SoM) compliant with the SMARC® 2.2 (Smart Mobility Architecture) standard. The module is compatible with most SMARC® 2.1 and SMARC® 2.0 carrier boards, enabling easy integration and faster product development.

Designed for Industrial Edge AI, Robotics, Machine Vision, Gateways, HMI, and Industrial Controllers, the IQ615 SoM combines high performance, rich connectivity, low power consumption, and long product lifecycle support in a compact form factor.

## 2. Qualcomm® Dragonwing™ IQ-615 SoC

The Qualcomm® Dragonwing™ IQ-615 is an industrial-grade AI-enabled processor optimized for edge computing and intelligent vision applications. It integrates an Octa-Core Kryo™ 460 CPU, Adreno™ 612 GPU, Hexagon™ DSP, and Spectra™ ISP to deliver efficient AI, graphics, and multimedia performance.

The IQ-615 supports the Qualcomm® Linux® software stack and is backed by a product longevity program with 10+ years of lifecycle support, making it a dependable platform for long-term industrial deployments.

## 3. Product Overview (IQ615 SOM)

The IQ615 SOM is a compact SMARC® 2.2 compliant module based on the Qualcomm® Dragonwing™ IQ-615 processor. It integrates processing, graphics, AI acceleration, memory, storage, and high-speed I/O interfaces into a compact industrial-grade computing platform.

The module supports LPDDR4x memory, eMMC/UFS storage, PCIe, USB, Gigabit Ethernet, MIPI CSI, MIPI, DSI/LVDS, Display Port, UART, I²C, SPI, CAN, Wi-Fi, and Bluetooth interfaces to simplify carrier-board design and accelerate product development.

Variants:

1. LVDS
2. DSI



## 4. Key Features

- Qualcomm® Dragonwing™ IQ-615 SoC
- Octa-Core Qualcomm® Kryo™ 460 CPU up to 1.9 GHz
- Qualcomm® Adreno™ 612 GPU
- Qualcomm® Hexagon™ V66 DSP with AI acceleration
- Up to 8GB LPDDR4x memory
- eMMC and UFS storage options
- Support for up to 2 concurrent cameras
- Video decode up to 4K60
- Video encode up to 1080p60
- PCIe, USB 3.1, Ethernet, CAN, UART, SPI, I²C, GPIO interfaces
- Wi-Fi 6 and Bluetooth support
- Commercial temperature Compatible
- Qualcomm® Linux® support

## 5. Applications

- Industrial Automation
- Industrial Controllers
- Robotics
- Machine Vision
- AI Cameras
- Industrial Gateways
- Human Machine Interface (HMI)
- Edge AI Computing
- Autonomous Platforms
- Industrial PCs

## 6. IQ-615 SoC Specifications

| Parameter                         | Description                                                           |
|-----------------------------------|-----------------------------------------------------------------------|
| Qualcomm® Artificial Intelligence | Integrated Qualcomm® AI Engine                                        |
| AI Performance                    | Up to 1.1 TOPs                                                        |
| GPU Name                          | Qualcomm® Adreno™ 612                                                 |
| CPU Name                          | Octa-core Qualcomm Kryo 460 (2× Gold @ 1.9 GHz + 6× Silver @ 1.6 GHz) |
| CPU Number of Cores               | 8                                                                     |
| Qualcomm® Hexagon™ Processor Name | Qualcomm® Hexagon™                                                    |
| <b>CPU</b>                        |                                                                       |
| Name                              | Octa-core Qualcomm Kryo 460 (2× Gold @ 1.9 GHz + 6× Silver @ 1.6 GHz) |
| Architecture                      | 64-bit                                                                |
| Clock Speed                       | Up to 1.9 GHz                                                         |
| <b>Memory</b>                     |                                                                       |

|                                     |                                                                                                                                                                                  |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Density                             | Up to 8 GB                                                                                                                                                                       |
| Bit Width                           | 16-bit                                                                                                                                                                           |
| Number of Channels                  | 2                                                                                                                                                                                |
| Speed                               | 1555 MHz                                                                                                                                                                         |
| Type                                | LPDDR4x                                                                                                                                                                          |
| <b>DSP</b>                          |                                                                                                                                                                                  |
| Name                                | Qualcomm® Hexagon™ V66                                                                                                                                                           |
| Clock Speed                         | Up to 1.0 GHz                                                                                                                                                                    |
| <b>Audio</b>                        |                                                                                                                                                                                  |
| Interface Type                      | I2S                                                                                                                                                                              |
| <b>Display</b>                      |                                                                                                                                                                                  |
| Display Processing Unit (DPU) Name  | Qualcomm® Adreno™ DPU                                                                                                                                                            |
| Number of Concurrent Displays       | 2                                                                                                                                                                                |
| Maximum External Display Resolution | 4K @ 60 Hz                                                                                                                                                                       |
| <b>Camera</b>                       |                                                                                                                                                                                  |
| Inputs                              | Up to 2 Concurrent Cameras                                                                                                                                                       |
| Image Signal Processor (ISP) Name   | Qualcomm® Spectra™ 230                                                                                                                                                           |
| Image Signal Processor (ISP) Type   | Image Signal Processor (ISP)                                                                                                                                                     |
| Supported Image Formats             | Bayer RGB, YUV, RCCB, Mono                                                                                                                                                       |
| <b>PCIe</b>                         |                                                                                                                                                                                  |
| Specification Version               | 1 Lane PCIe Gen 2                                                                                                                                                                |
| <b>Universal Serial Bus (USB)</b>   |                                                                                                                                                                                  |
| Number of Interfaces                | 2                                                                                                                                                                                |
| Specification Version               | 1 × USB 3.1 Gen1, 2 × USB 2.0                                                                                                                                                    |
| <b>Ethernet</b>                     |                                                                                                                                                                                  |
| Interface                           | 1× Gigabit Ethernet Support (Via SMARC Connector)                                                                                                                                |
| <b>Storage</b>                      |                                                                                                                                                                                  |
| eMMC                                | 1 × 8-bit eMMC 5.1                                                                                                                                                               |
| SD                                  | 1 × 4-bit SD 3.0                                                                                                                                                                 |
| UFS                                 | 1-Lane UFS 2.1 Gear 3                                                                                                                                                            |
| <b>Wireless Connectivity</b>        |                                                                                                                                                                                  |
| Bluetooth Specification Version     | Bluetooth® 5.3                                                                                                                                                                   |
| Wi-Fi Support                       | External Wi-Fi Module Support                                                                                                                                                    |
| <b>Security</b>                     |                                                                                                                                                                                  |
| Features                            | Secure boot, secure debug, TrustZone, Qualcomm® Trusted Execution Environment, hardware supported KeyStore, HDCP v1.4 and 2.2 for DisplayPort, secure I²C and secure SPI, AVB2.0 |
| <b>Video Processing</b>             |                                                                                                                                                                                  |
| Decode                              | Up to 4K60 (H.265, H.264, VP9)                                                                                                                                                   |
| Encode                              | Up to 1080p60 (H.265, H.264)                                                                                                                                                     |
| <b>Power Management</b>             |                                                                                                                                                                                  |
| Low Power Modes                     | Supported                                                                                                                                                                        |
| <b>Software Options</b>             |                                                                                                                                                                                  |
| Operating System                    | Qualcomm® Linux®, Yocto Linux                                                                                                                                                    |
| <b>Package</b>                      |                                                                                                                                                                                  |

|                            |                   |
|----------------------------|-------------------|
| Type                       | FCBGA             |
| Pins                       | 761               |
| Size                       | 23 × 23 × 2.45 mm |
| Pitch                      | 0.8 mm            |
| <b>Temperature</b>         |                   |
| Junction Temperature Range | 0°C to +105°C     |

## 7. SOM Specifications

| Parameter              | Description                       |
|------------------------|-----------------------------------|
| Form Factor            | SMARC® 2.2                        |
| Backward Compatibility | SMARC® 2.1 / 2.0                  |
| Module Dimensions      | 82 mm × 50 mm                     |
| Memory Options         | Up to 8GB LPDDR4x                 |
| Storage Options        | eMMC / UFS                        |
| Ethernet               | Gigabit Ethernet                  |
| Camera Interface       | MIPI CSI-2                        |
| Display Interface      | MIPI DSI or LVDS, DisplayPort 1.4 |
| USB                    | USB 3.1, USB 2.0                  |
| PCIe                   | PCIe Gen2                         |
| UART                   | Supported                         |
| SPI                    | Supported                         |
| I <sup>2</sup> C       | Supported                         |
| CAN                    | Supported                         |
| GPIO                   | Supported                         |
| Wireless Connectivity  | Wi-Fi 6, Bluetooth 5.3            |
| Operating Systems      | Qualcomm Linux®, Yocto Linux      |
| Operating Temperature  | 0°C to +70°C                      |

## 8. Interfaces Overview

| Feature                | Sub Feature                                     | SMAR C Spec | IQ615 Module  | Notes                   | I/O Voltages          |
|------------------------|-------------------------------------------------|-------------|---------------|-------------------------|-----------------------|
| <b>Wireless Module</b> | Wireless Module                                 | May         | Yes           | Wi-Fi 6 + Bluetooth 5.3 | 1.8V                  |
| <b>Size</b>            | 82 × 50 mm                                      | Shall       | Yes           | SMARC Short Size        | -                     |
|                        | 82 × 80 mm                                      | May         | Not Available |                         |                       |
| <b>LVDS LCD</b>        | LVDS0 18-bit Single Channel                     | Should      | Yes           |                         | As per LVDS standards |
|                        | LVDS0 24-bit Single Channel (18-bit Compatible) | Should      | Yes           |                         |                       |

|                        |                                                |        |               |                 |                                   |
|------------------------|------------------------------------------------|--------|---------------|-----------------|-----------------------------------|
|                        | LVDS0 24-bit Single Channel Standard Color Map | May    | Yes           |                 |                                   |
|                        | LVDS1 24-bit Single Channel                    | May    | Not Available |                 |                                   |
|                        | LVDS0 Dual Channel 18-bit                      | May    | Not Available |                 |                                   |
|                        | LVDS0 Dual Channel Standard Color Map          | May    | Not Available |                 |                                   |
|                        | eDP0 on LVDS0 (4 Diff Pairs)                   | May    | Not Available |                 |                                   |
|                        | eDP1 on LVDS1 (4 Diff Pairs)                   | May    | Not Available |                 |                                   |
| <b>DSI</b>             | DSI0 2-Lane Implementation                     | May    | Not Available |                 | As per DSI standards (1.2V)       |
|                        | DSI0 4-Lane Implementation                     | May    | Available     | Primary Display |                                   |
|                        | DSI1 2-Lane Implementation                     | May    | Not Available |                 |                                   |
|                        | DSI1 4-Lane Implementation                     | May    | Not Available |                 |                                   |
| <b>HDMI</b>            | HDMI Display Interface                         | Should | Not Available |                 | -                                 |
| <b>DP on HDMI Pins</b> | DP1                                            | May    | Not Available |                 | -                                 |
| <b>DP++</b>            | DisplayPort++                                  | May    | Not Available |                 | -                                 |
| <b>DisplayPort</b>     | DisplayPort 1.4                                | May    | Available     | Up to 4K@60Hz   | As per Display Port 1.4 standards |
| <b>CSI</b>             | CSI0 2-Lane                                    | May    | Available     | MIPI CSI0       | As per CSI standards (1.2V)       |
|                        | CSI1 2-Lane                                    | Should | Available     | MIPI CSI1       |                                   |
|                        | CSI1 4-Lane                                    | Should | Available     | MIPI CSI1       |                                   |
|                        | CSI2 2-Lane                                    | May    | Not Available |                 |                                   |
|                        | CSI2 4-Lane                                    | May    | Not Available |                 |                                   |
|                        | CSI3 2-Lane                                    | May    | Not Available |                 |                                   |
|                        | CSI3 4-Lane                                    | May    | Not Available |                 |                                   |
| <b>SDIO</b>            | SDIO (4-bit for SD Cards)                      | Should | Available     |                 | As per SDIO                       |

|                       |                          |        |                  |                             |                                |
|-----------------------|--------------------------|--------|------------------|-----------------------------|--------------------------------|
|                       |                          |        |                  |                             | standard<br>s                  |
| <b>SPI</b>            | SPI0                     | Should | Available        |                             | 1.8V                           |
|                       | SPI1                     | Should | Available        |                             |                                |
|                       | QuadSPI                  | Should | Available        |                             |                                |
|                       | eSPI                     | Should | Not<br>Available |                             |                                |
| <b>Audio</b>          | I2S0                     | Should | Available        |                             | -                              |
|                       | HDA or I2S2              | Should | Available        | I2S2                        |                                |
| <b>I<sup>2</sup>C</b> | Power Management         | Shall  | Available        |                             | 1.8V                           |
|                       | General Purpose          | Shall  | Available        |                             |                                |
|                       | Camera0                  | Should | Available        |                             |                                |
|                       | Camera1                  | Should | Available        |                             |                                |
|                       | Camera2                  | Should | Available        |                             |                                |
|                       | Camera3                  | Should | Available        |                             |                                |
|                       | LCD Display I/D          | Should | Available        |                             |                                |
|                       | HDMI                     | Should | Not<br>Available |                             |                                |
| <b>Serial Ports</b>   | SER0 (4 Wire)            | Shall  | Available        | 4-Wire<br>UART              | 1.8V                           |
|                       | SER1 (2 Wire)            | Shall  | Available        | 2-Wire<br>UART              |                                |
|                       | SER2 (4 Wire)            | Should | Available        | 4-Wire<br>UART              |                                |
|                       | SER3 (2 Wire)            | Should | Available        | 2-Wire<br>UART              |                                |
| <b>CAN Bus</b>        | CAN0                     | May    | Available        | Native CAN                  | 1.8V                           |
|                       | CAN1                     | May    | Available        | Native CAN                  |                                |
| <b>USB</b>            | USB0 (2.0 OTG)           | Shall  | Available        | Recovery<br>Mode<br>Support | As per<br>USB<br>standard<br>s |
|                       | USB1 (2.0 Host)          | Should | Available        |                             |                                |
|                       | USB2 (2.0)               | May    | Available        |                             |                                |
|                       | USB2 SuperSpeed          | Should | Available        | USB 3.1<br>Gen1             |                                |
|                       | USB3 (2.0)               | May    | Available        |                             |                                |
|                       | USB3 SuperSpeed          | May    | Available        | USB 3.1<br>Gen1             |                                |
|                       | USB4 (2.0)               | May    | Available        |                             |                                |
|                       | USB5 (2.0)               | May    | Not<br>Available |                             |                                |
| <b>PCIe</b>           | PCIe_A (x1 Gen1<br>Root) | Should | Available        | PCIe Gen2<br>x1             | -                              |
|                       | PCIe_B (x1 Gen1<br>Root) | May    | Not<br>Available |                             |                                |

|                   |                                         |        |               |                     |                           |
|-------------------|-----------------------------------------|--------|---------------|---------------------|---------------------------|
|                   | PCIe_C (x1 Gen1 Root)                   | May    | Not Available |                     |                           |
|                   | PCIe_D (x1 Gen1 Root)                   | May    | Not Available |                     |                           |
|                   | PCIe Gen1 Operation                     | Should | Available     |                     |                           |
|                   | PCIe Gen2 Operation                     | May    | Available     | Maximum Supported   |                           |
|                   | PCIe Gen3 Operation                     | May    | Not Available |                     |                           |
| <b>SERDES</b>     | Alternative use of PCIE_C and/or PCIE_D | May    | Not Available |                     | -                         |
| <b>SATA</b>       | SATA Gen1                               | Should | Not Available |                     | -                         |
|                   | SATA Gen2 Operation                     | May    | Not Available |                     |                           |
|                   | SATA Gen3 Operation                     | May    | Not Available |                     |                           |
| <b>GBE</b>        | GBE0                                    | Should | Available     | Gigabit Ethernet    | As per ethernet standards |
|                   | GBE1                                    | May    | Not Available |                     |                           |
|                   | IEEE1588 Triggers (GBE[0:1]_SDP)        | May    | Not Available |                     |                           |
| <b>Watchdog</b>   | WDT Out                                 | Should | Available     |                     | -                         |
| <b>GPIO</b>       | GPIO[0:11]                              | Shall  | Available     |                     | 1.8V                      |
|                   | GPIO[12:13]                             | Should | Available     |                     |                           |
|                   | GPIO[0:11] Interrupt Capability         | Shall  | Available     |                     |                           |
|                   | GPIO[12:13] Interrupt Capability        | Should | Available     |                     |                           |
|                   | GPIO Camera Support                     | Shall  | Available     |                     |                           |
|                   | GPIO5 PWM Capability                    | Should | Available     |                     |                           |
|                   | GPIO6 Tachin Capability                 | Should | Not Available |                     |                           |
| <b>Management</b> | System and Power Management Features    | Shall  | Available     | SMARC 2.2 Compliant | -                         |
|                   | BATLOW#                                 | Shall  | Available     |                     | 1.8V                      |
|                   | CARRIER_PWR_ON                          | Shall  | Available     |                     | 3.3V                      |
|                   | CARRIER_STBY#                           | Should | Available     |                     | 1.8V                      |
|                   | CHARGER_PRSENT#                         | Should | Available     |                     | 1.8V                      |

|                       |                                            |        |               |                         |      |
|-----------------------|--------------------------------------------|--------|---------------|-------------------------|------|
|                       | CHARGING#                                  | Should | Available     |                         | 1.8V |
|                       | VIN_PWR_BAD#                               | Should | Available     |                         | 5V   |
|                       | SLEEP#                                     | Should | Available     |                         | 1.8V |
|                       | LID#                                       | Should | Available     |                         | 1.8V |
|                       | POWER_BTN#                                 | Should | Available     |                         | 1.8V |
|                       | RESET_OUT#                                 | Should | Available     |                         | 1.8V |
|                       | RESET_IN#                                  | Should | Available     |                         | 1.8V |
|                       | SMB_ALERT#                                 | Should | Not Available |                         | -    |
|                       | TEST#                                      | Should | Available     |                         | -    |
| <b>Boot Select</b>    | BOOT_SEL0# /<br>BOOT_SEL1# /<br>BOOT_SEL2# | Shall  | Available     |                         | 1.8V |
| <b>Force Recovery</b> | FORCE_RECOV#                               | Shall  | Available     | Qualcomm Recovery Mode  | 1.8V |
| <b>JTAG</b>           | JTAG Connector on Module                   | May    | Available     | Header Available on SOM | 1.8V |
| <b>RTC</b>            | VDD_RTC                                    | Should | Available     | RTC with Backup Support | 3.3V |
| <b>AI Features</b>    | Qualcomm® AI Engine                        | N/A    | Available     | Up to 1 TOPS            | -    |
|                       | Qualcomm® Hexagon™ V66 DSP                 | N/A    | Available     | AI Acceleration         |      |
|                       | Qualcomm® Spectra™ 230 ISP                 | N/A    | Available     | Vision Processing       |      |
|                       | Concurrent Cameras                         | N/A    | Up to 6       | Supported by IQ615      |      |
| <b>Security</b>       | Qualcomm® TrustZone®                       | N/A    | Available     |                         | -    |
|                       | Secure Boot                                | N/A    | Available     |                         |      |
|                       | Cryptographic Accelerator                  | N/A    | Available     |                         |      |
| <b>Storage</b>        | eMMC 5.1                                   | N/A    | Available     |                         | -    |
|                       | UFS 2.1 Gear 3                             | N/A    | Available     |                         |      |
| <b>Software</b>       | Qualcomm® Linux®                           | N/A    | Available     |                         | -    |
|                       | Yocto Linux                                | N/A    | Available     |                         |      |
| <b>Physical</b>       | Operating Temperature                      | N/A    | 0°C to +70°C  | Industrial Grade        | -    |
|                       | Memory Capacity                            | N/A    | Up to 8GB     |                         |      |

|  |                               |     |                     |  |  |
|--|-------------------------------|-----|---------------------|--|--|
|  |                               |     | LPDDR4<br>x         |  |  |
|  | AI Performance                | N/A | Up to 1<br>TOPS     |  |  |
|  | Display Support               | N/A | Up to 3<br>Displays |  |  |
|  | Maximum Display<br>Resolution | N/A | 4K @<br>60Hz        |  |  |

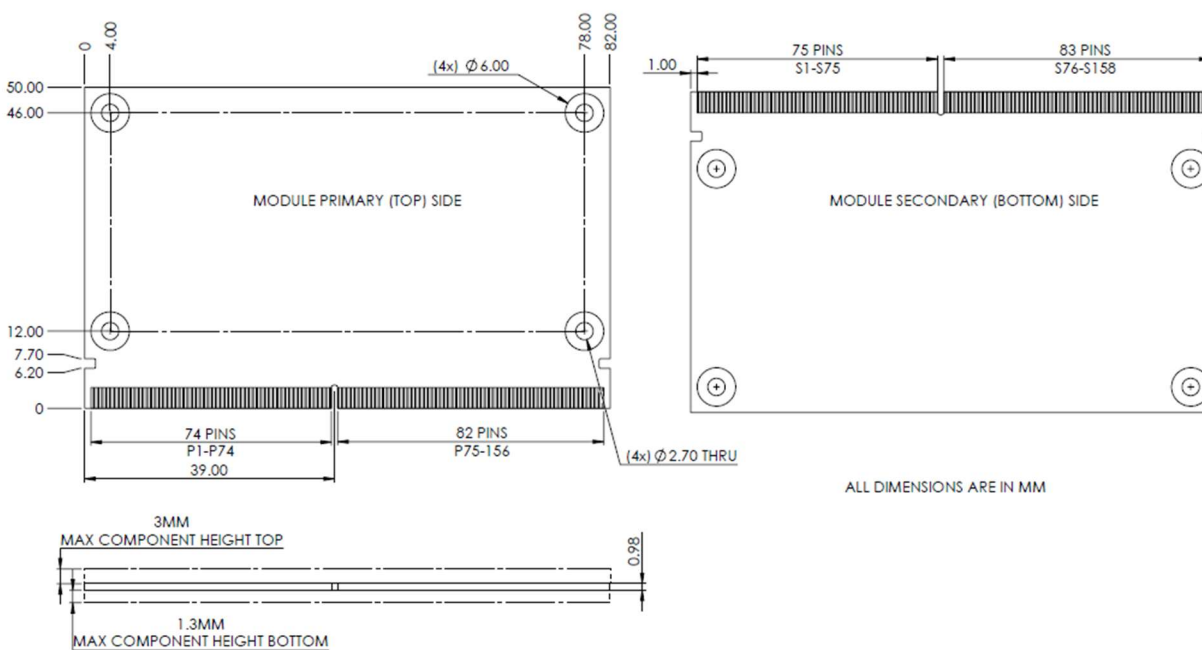
## 9. Reference Documents

SMARC Specification

IQ-615 SMARC SoM design follows SMARAC 2.2 specification

- [SMARC Hardware Specification 2.2](#)
- [SMARC Design Guide 2.2](#)

## 10. Mechanical Specifications



## 11. High-Speed Connectivity

| Interface   | Specification                 |
|-------------|-------------------------------|
| PCIe        | 1 × PCIe 2.0                  |
| USB         | 1 × USB 3.1 Gen1, 1 × USB 2.0 |
| Ethernet    | 1×Ethernet                    |
| DisplayPort | DP 1.4                        |
| Camera      | MIPI CSI                      |
| Display     | MIPI DSI                      |

## 12. Recommended Operating Conditions

| Parameter             | Min    | Typical | Max    |
|-----------------------|--------|---------|--------|
| Input Voltage         | 4.75 V | 5 V     | 5.25 V |
| Operating Temperature | 0°C    | 25°C    | +70°C  |
| Relative Humidity     | 5%     | 50%     | 95%    |
| Storage Temperature   | 0°C    | -       | +70°C  |

## 13. Absolute Maximum Ratings

| Parameter            | Rating             |
|----------------------|--------------------|
| Junction Temperature | +105°C             |
| Storage Temperature  | 0°C to +70°C       |
| Relative Humidity    | 95% non-condensing |
| ESD Rating           | TBD                |
| Input Voltage        | TBD                |

## 14. Thermal Specifications

| Parameter             | Specification |
|-----------------------|---------------|
| Operating Temperature | 0°C to +70°C  |
| Junction Temperature  | Up to +105°C  |
| Storage Temperature   | 0°C to +70°C  |

## 15. Carrier Board Design Guidelines

|                    |                                                                                                                                                                                                                                                                                                                                |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High-Speed Routing | <ul style="list-style-type: none"> <li>• PCIe Differential Impedance: 85 <math>\Omega</math></li> <li>• USB Differential Impedance: 90 <math>\Omega</math></li> <li>• MIPI CSI/DSI Differential Impedance: 100 <math>\Omega</math></li> <li>• Match differential pair lengths.</li> <li>• Minimize via transitions.</li> </ul> |
| Power Design       | <ul style="list-style-type: none"> <li>• Follow PMIC sequencing requirements.</li> <li>• Use dedicated power and ground planes.</li> <li>• Provide adequate decoupling</li> </ul>                                                                                                                                              |
| Thermal Design     | <ul style="list-style-type: none"> <li>• Use thermal vias below processor area.</li> <li>• Heatsink recommended sustained AI workloads.</li> <li>• Ensure proper airflow.</li> </ul>                                                                                                                                           |

## 16. Software Support

| Component            | Support |
|----------------------|---------|
| Qualcomm® Linux®     | Yes     |
| Yocto Linux          | Yes     |
| BSP Package          | Yes     |
| SDK Support          | Yes     |
| AI Framework Support | Yes     |

## 17. Pin Assignments

| MXM<br>3 Pin | SMARC Signal | SoC Signal        | Note | Signal<br>Type | Voltage    |
|--------------|--------------|-------------------|------|----------------|------------|
| P1           | SMB_ALERT#   | NC                |      | -              | -          |
| P2           | GND          | GND               |      | Power          | 0          |
| P3           | CSI1_CK+     | MIPI_CSI1_CLK_P   |      | Input          | 100–300 mV |
| P4           | CSI1_CK-     | MIPI_CSI1_CLK_N   |      | Input          | 100–300 mV |
| P5           | GBE1_SDP     | NC                |      | -              | -          |
| P6           | GBE0_SDP     | NC                |      | -              | -          |
| P7           | CSI1_RX0+    | MIPI_CSI1_LANE0_P |      | Input          | 100–300 mV |
| P8           | CSI1_RX0-    | MIPI_CSI1_LANE0_N |      | Input          | 100–300 mV |
| P9           | GND          | GND               |      | Power          | 0          |
| P10          | CSI1_RX1+    | MIPI_CSI1_LANE1_P |      | Input          | 100–300 mV |
| P11          | CSI1_RX1-    | MIPI_CSI1_LANE1_N |      | Input          | 100–300 mV |
| P12          | GND          | GND               |      | Power          | 0          |
| P13          | CSI1_RX2+    | MIPI_CSI1_LANE2_P |      | Input          | 100–300 mV |
| P14          | CSI1_RX2-    | MIPI_CSI1_LANE2_N |      | Input          | 100–300 mV |
| P15          | GND          | GND               |      | Power          | 0          |
| P16          | CSI1_RX3+    | MIPI_CSI1_LANE3_P |      | Input          | 100–300 mV |
| P17          | CSI1_RX3-    | MIPI_CSI1_LANE3_N |      | Input          | 100–300 mV |

|     |                |                         |                              |               |          |
|-----|----------------|-------------------------|------------------------------|---------------|----------|
| P18 | GND            | GND                     |                              | Power         | 0        |
| P19 | GBE0_MDI3-     | GIGE_CH1_TXRX3_N        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P20 | GBE0_MDI3+     | GIGE_CH1_TXRX3_P        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P21 | GBE0_LINK_MID# | NC                      |                              | -             | -        |
| P22 | GBE0_LINK_MAX# | GIGE_CH1_LED_LINK1000_N | From Eth Phy<br>KSZ9031RNXIA | Input         | 3.3V     |
| P23 | GBE0_MDI2-     | GIGE_CH1_TXRX2_N        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P24 | GBE0_MDI2+     | GIGE_CH1_TXRX2_P        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P25 | GBE0_LINK_ACT# | GIGE_CH1_LED_ACT_N      | From Eth Phy<br>KSZ9031RNXIA | Input         | 3.3V     |
| P26 | GBE0_MDI1-     | GIGE_CH1_TXRX1_N        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P27 | GBE0_MDI1+     | GIGE_CH1_TXRX1_P        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P28 | GBE0_CTREF     | NC                      |                              | -             | -        |
| P29 | GBE0_MDI0-     | GIGE_CH1_TXRX0_N        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P30 | GBE0_MDI0+     | GIGE_CH1_TXRX0_P        | From Eth Phy<br>KSZ9031RNXIA | Bidirectional | 1.8/3.3V |
| P31 | SPI0_CS1#      | NC                      |                              | -             | -        |
| P32 | GND            | GND                     |                              | Power         | 0        |
| P33 | SDIO_WP        | SOC_GPIO_24_SDIO_WP     |                              | Output        | 1.8V     |
| P34 | SDIO_CMD       | SDC2_uSD_CMD            |                              | Output        | 2.96V    |

|     |                                         |                      |  |               |       |
|-----|-----------------------------------------|----------------------|--|---------------|-------|
| P35 | SDIO_CD#                                | SDC_DET_S4A_1P8_N    |  | Input         | 1.8V  |
| P36 | SDIO_CK                                 | SDC2_uSD_CLK         |  | Output        | 2.96V |
| P37 | SDIO_PWR_EN                             | SDIO_PWR_EN_3P3      |  | Output        | 3.3V  |
| P38 | GND                                     | GND                  |  | Power         | 0     |
| P39 | SDIO_D0                                 | SDC2_uSD_DATA_0      |  | Bidirectional | 2.96V |
| P40 | SDIO_D1                                 | SDC2_uSD_DATA_1      |  | Bidirectional | 2.96V |
| P41 | SDIO_D2                                 | SDC2_uSD_DATA_2      |  | Bidirectional | 2.96V |
| P42 | SDIO_D3                                 | SDC2_uSD_DATA_3      |  | Bidirectional | 2.96V |
| P43 | SPI0_CS0#                               | SOC_GPIO_23_SPI_CS#  |  | Input         | 1.8V  |
| P44 | SPI0_CK                                 | SOC_GPIO_22_SPI_CLK  |  | Input         | 1.8V  |
| P45 | SPI0_DIN                                | SOC_GPIO_20_SPI_MISO |  | Output        | 1.8V  |
| P46 | SPI0_DO                                 | SOC_GPIO_21_SPI_MOSI |  | Input         | 1.8V  |
| P47 | GND                                     | GND                  |  | Power         | 0     |
| P48 | SATA_TX+                                | NC                   |  | -             | -     |
| P49 | SATA_TX-                                | NC                   |  | -             | -     |
| P50 | GND                                     | GND                  |  | Power         | 0     |
| P51 | SATA_RX+                                | NC                   |  | -             | -     |
| P52 | SATA_RX-                                | NC                   |  | -             | -     |
| P53 | GND                                     | GND                  |  | Power         | 0     |
| P54 | SPI1_CS0# /<br>ESPI_CS0# /<br>QSPI_CS0# | SOC_SSC_CS0#_S4A_1P8 |  | Output        | 1.8V  |

|     |                                         |                      |  |               |        |
|-----|-----------------------------------------|----------------------|--|---------------|--------|
| P55 | SPI1_CS1# /<br>ESPI_CS1# /<br>QSPI_CS1# | SOC_SSC_CS1#_S4A_1P8 |  | Output        | 1.8V   |
| P56 | SPI1_CK /<br>ESPI_CK /<br>QSPI_CK       | SOC_SSC_SCLK_S4A_1P8 |  | Output        | 1.8V   |
| P57 | SPI1_DIN /<br>ESPI_IO_1 /<br>QSPI_IO_1  | SOC_SSC_MISO_S4A_1P8 |  | Output        | 1.8V   |
| P58 | SPI1_DO /<br>ESPI_IO_0 /<br>QSPI_IO_0   | SOC_SSC_MOSI_S4A_1P8 |  | Input         | 1.8V   |
| P59 | GND                                     | GND                  |  | Power         | 0      |
| P60 | USB0+                                   | PORT0_USB0_HS_DP     |  | Bidirectional | ±400mV |
| P61 | USB0-                                   | PORT0_USB0_HS_DM     |  | Bidirectional | ±400mV |
| P62 | USB0_EN_OC#                             | USB0_PORT_EN_OC#     |  | Output        | 3.3V   |
| P63 | USB0_VBUS_DET                           | USB0_VBUS_DETECT     |  | Input         | 5V     |
| P64 | USB0_OTG_ID                             | USB0_OTG_ID          |  | Input         | 3.3V   |
| P65 | USB1+                                   | NC                   |  | -             | -      |
| P66 | USB1-                                   | NC                   |  | -             | -      |
| P67 | USB1_EN_OC#                             | NC                   |  | -             | -      |
| P68 | GND                                     | GND                  |  | Power         | 0      |
| P69 | USB2+                                   | PORT2_USB0_HS_DP     |  | Bidirectional | ±400mV |
| P70 | USB2-                                   | PORT2_USB0_HS_DM     |  | Bidirectional | ±400mV |

|     |                          |                   |  |               |        |
|-----|--------------------------|-------------------|--|---------------|--------|
| P71 | USB2_EN_OC#              | USB2_PORT_EN_OC#  |  | Output        | 3.3V   |
| P72 | RSVD                     | NC                |  | -             | -      |
| P73 | RSVD                     | NC                |  | -             | -      |
| P74 | USB3_EN_OC#              | USB3_PORT_EN_OC#  |  | Output        | 3.3V   |
| key |                          |                   |  |               |        |
| P75 | PCIE_A_RST#              | PCIE_A_RST#       |  | Input         | 3.3V   |
| P76 | USB4_EN_OC#              | NC                |  | -             | -      |
| P77 | PCIE_B_CKREQ#            | NC                |  | -             | -      |
| P78 | PCIE_A_CKREQ#            | PCIE_A_CLK_REQ#   |  | Bidirectional | 3.3V   |
| P79 | GND                      | GND               |  | Power         | 0      |
| P80 | PCIE_C_REFCK+            | NC                |  | -             | -      |
| P81 | PCIE_C_REFCK-            | NC                |  | -             | -      |
| P82 | GND                      | GND               |  | Power         | 0      |
| P83 | PCIE_A_REFCK+            | QCS_PCIE_REFCLK_P |  | Output        | ±800mV |
| P84 | PCIE_A_REFCK-            | QCS_PCIE_REFCLK_M |  | Output        | ±800mV |
| P85 | GND                      | GND               |  | Power         | 0      |
| P86 | PCIE_A_RX+               | QCS_PCIE_RX_P     |  | Input         | ±1.2V  |
| P87 | PCIE_A_RX-               | QCS_PCIE_RX_M     |  | Input         | ±1.2V  |
| P88 | GND                      | GND               |  | Power         | 0      |
| P89 | PCIE_A_TX+               | QCS_PCIE_TX_P     |  | Output        | ±1.2V  |
| P90 | PCIE_A_TX-               | QCS_PCIE_TX_M     |  | Output        | ±1.2V  |
| P91 | GND                      | GND               |  | Power         | 0      |
| P92 | HDMI_D2+ /<br>DP1_LANE0+ | NC                |  | -             | -      |

|      |                             |                     |  |        |      |
|------|-----------------------------|---------------------|--|--------|------|
| P93  | HDMI_D2- /<br>DP1_LANE0-    | NC                  |  | -      | -    |
| P94  | GND                         | GND                 |  | Power  | 0    |
| P95  | HDMI_D1+ /<br>DP1_LANE1+    | NC                  |  | -      | -    |
| P96  | HDMI_D1- /<br>DP1_LANE1-    | NC                  |  | -      | -    |
| P97  | GND                         | GND                 |  | Power  | 0    |
| P98  | HDMI_D0+ /<br>DP1_LANE2+    | NC                  |  | -      | -    |
| P99  | HDMI_D0- /<br>DP1_LANE2-    | GND                 |  | Power  | 0    |
| P100 | GND                         | GND                 |  | Power  | 0    |
| P101 | HDMI_CK+ /<br>DP1_LANE3+    | NC                  |  | -      | -    |
| P102 | HDMI_CK- /<br>DP1_LANE3-    | NC                  |  | -      | -    |
| P103 | GND                         | GND                 |  | Power  | 0    |
| P104 | HDMI_HPD /<br>DP1_HPD       | NC                  |  | -      | -    |
| P105 | HDMI_CTRL_CK /<br>DP1_AUX+  | NC                  |  | -      | -    |
| P106 | HDMI_CTRL_DAT<br>/ DP1_AUX- | NC                  |  | -      | -    |
| P107 | DP1_AUX_SEL                 | NC                  |  | -      | -    |
| P108 | GPIO0 /<br>CAM0_PWR#        | CCIO_PWR_EN_S4A_1P8 |  | Output | 1.8V |

|      |                      |                            |  |               |      |
|------|----------------------|----------------------------|--|---------------|------|
| P109 | GPIO1 /<br>CAM1_PWR# | CCI1_PWR_EN_S4A_1P8        |  | Output        | 1.8V |
| P110 | GPIO2 /<br>CAM0_RST# | SOC_GPIO_74_CAM0_RST#      |  | Output        | 1.8V |
| P111 | GPIO3 /<br>CAM1_RST# | SOC_GPIO_75_CAM1_RST#      |  | Output        | 1.8V |
| P112 | GPIO4 /<br>HDA_RST#  | SOC_GPIO_67_S4A_1P8        |  | Output        | 1.8V |
| P113 | GPIO5 /<br>PWM_OUT   | SOC_GPIO_69_S4A_1P8        |  | Output        | 1.8V |
| P114 | GPIO6 / TACHIN       | SOC_GPIO_41_CAM_CTRL       |  | Output        | 1.8V |
| P115 | GPIO7                | SOC_GPIO_31_S4A_1P8        |  | Bidirectional | 1.8V |
| P116 | GPIO8                | SOC_GPIO_84_S4A_1P8        |  | Bidirectional | 1.8V |
| P117 | GPIO9                | SOC_GPIO_85_S4A_1P8        |  | Bidirectional | 1.8V |
| P118 | GPIO10               | SOC_GPIO_91_S4A_1P8        |  | Bidirectional | 1.8V |
| P119 | GPIO11               | PMM6155AU_GPIO_02_VOL+     |  | Output        | 1.8V |
| P120 | GND                  | GND                        |  | Power         | 0    |
| P121 | I2C_PM_CK            | SOC_SENSOR_I2C_SCL_S4A_1P8 |  | Output        | 1.8V |
| P122 | I2C_PM_DAT           | SOC_SENSOR_I2C_SDA_S4A_1P8 |  | Bidirectional | 1.8V |
| P123 | BOOT_SEL0#           | SOC_GPIO_88_S4A_1P8        |  | Bidirectional | 1.8V |

|      |            |                          |  |               |      |
|------|------------|--------------------------|--|---------------|------|
| P124 | BOOT_SEL1# | SOC_GPIO_27_S4A_1P8      |  | Bidirectional | 1.8V |
| P125 | BOOT_SEL2# | SOC_GPIO_120_S4A_1P8     |  | Bidirectional | 1.8V |
| P126 | RESET_OUT# | SOC_RESOUT_BUF_S4A_1P8_N |  | Output        | 1.8V |
| P127 | RESET_IN#  | PMM_RES_IN_VIO_OUT_1P8   |  | Input         | 1.8V |
| P128 | POWER_BTN# | KPDPWR_BTN#              |  | Input         | 1.8V |
| P129 | SER0_TX    | SOC_DBG_UART_TX_S4A_1P8  |  | Input         | 1.8V |
| P130 | SER0_RX    | SOC_DBG_UART_RX_S4A_1P8  |  | Output        | 1.8V |
| P131 | SER0_RTS#  | NC                       |  | -             | -    |
| P132 | SER0_CTS#  | NC                       |  | -             | -    |
| P133 | GND        | GND                      |  | Power         | 0    |
| P134 | SER1_TX    | SSC_QUP3_UART_TX         |  | Input         | 1.8V |
| P135 | SER1_RX    | SSC_QUP3_UART_RX         |  | Output        | 1.8V |
| P136 | SER2_TX    | SSC_QUP5_UART_TX         |  | Input         | 1.8V |
| P137 | SER2_RX    | SSC_QUP5_UART_RX         |  | Output        | 1.8V |
| P138 | SER2_RTS#  | SSC_QUP5_UART_RTS        |  | Output        | 1.8V |
| P139 | SER2_CTS#  | SSC_QUP5_UART_CTS        |  | Input         | 1.8V |
| P140 | SER3_TX    | SMARC_SER3_UART_TX       |  | Input         | 1.8V |
| P141 | SER3_RX    | SMARC_SER3_UART_RX       |  | Output        | 1.8V |
| P142 | GND        | GND                      |  | Power         | 0    |

|      |                            |                  |                                         |               |      |
|------|----------------------------|------------------|-----------------------------------------|---------------|------|
| P143 | CAN0_TX                    | CAN0_TXD         | From SPI to<br>CAN Converter<br>MCP2515 | Input         | 1.8V |
| P144 | CAN0_RX                    | CAN0_RXD         | From SPI to<br>CAN Converter<br>MCP2515 | Output        | 1.8V |
| P145 | CAN1_TX                    | NC               |                                         | -             | -    |
| P146 | CAN1_RX                    | NC               |                                         | -             | -    |
| P147 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P148 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P149 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P150 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P151 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P152 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P153 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P154 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P155 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| P156 | VDD_IN                     | VDD_IN           |                                         | Power         | 5V   |
| S1   | CSI1_TX+ /<br>I2C_CAM1_CK  | CCI1_SCL_S4A_1P8 |                                         | Output        | 1.8V |
| S2   | CSI1_TX- /<br>I2C_CAM1_DAT | CCI1_SDA_S4A_1P8 |                                         | Bidirectional | 1.8V |
| S3   | GND                        | GND              |                                         | Power         | 0    |
| S4   | RSVD                       | NC               |                                         | -             | -    |
| S5   | I2C_CAM0_CK /<br>CSI0_TX+  | CCI0_SCL_S4A_1P8 |                                         | Output        | 1.8V |
| S6   | CAM_MCK                    | CAM_MCLK         |                                         | Input         | 1.8V |

|     |                            |                   |  |       |            |
|-----|----------------------------|-------------------|--|-------|------------|
| S7  | I2C_CAM0_DAT /<br>CSI0_TX- | CCI0_SDA_S4A_1P8  |  | Input | 1.8V       |
| S8  | CSI0_CK+                   | MIPI_CSI0_CLK_P   |  | Input | 100–300 mV |
| S9  | CSI0_CK-                   | MIPI_CSI0_CLK_N   |  | Input | 100–300 mV |
| S10 | GND                        | GND               |  | power | 0          |
| S11 | CSI0_RX0+                  | MIPI_CSI0_LANE0_P |  | Input | 100–300 mV |
| S12 | CSI0_RX0-                  | MIPI_CSI0_LANE0_N |  | Input | 100–300 mV |
| S13 | GND                        | GND               |  | power | 0          |
| S14 | CSI0_RX1+                  | MIPI_CSI0_LANE1_P |  | Input | 100–300 mV |
| S15 | CSI0_RX1-                  | MIPI_CSI0_LANE1_N |  | Input | 100–300 mV |
| S16 | GND                        | GND               |  | Power | 0          |
| S17 | GBE1_MDI0+                 | NC                |  | -     | -          |
| S18 | GBE1_MDI0-                 | NC                |  | -     | -          |
| S19 | GBE1_LINK_MID<br>#         | NC                |  | -     | -          |
| S20 | GBE1_MDI1+                 | NC                |  | -     | -          |
| S21 | GBE1_MDI1-                 | NC                |  | -     | -          |
| S22 | GBE1_LINK_MAX<br>#         | NC                |  | -     | -          |
| S23 | GBE1_MDI2+                 | NC                |  | -     | -          |
| S24 | GBE1_MDI2-                 | NC                |  | -     | -          |
| S25 | GND                        | GND               |  | Power | 0          |
| S26 | GBE1_MDI3+                 | NC                |  | -     | -          |
| S27 | GBE1_MDI3-                 | NC                |  | -     | -          |
| S28 | GBE1_CTREF                 | NC                |  | -     | -          |

|     |                              |                         |  |               |      |
|-----|------------------------------|-------------------------|--|---------------|------|
| S29 | PCIE_D_TX+ /<br>SERDES_0_TX+ | NC                      |  | -             | -    |
| S30 | PCIE_D_TX- /<br>SERDES_0_TX- | NC                      |  | -             | -    |
| S31 | GBE1_LINK_ACT<br>#           | NC                      |  | -             | -    |
| S32 | PCIE_D_RX+ /<br>SERDES_0_RX+ | NC                      |  | -             | -    |
| S33 | PCIE_D_RX- /<br>SERDES_0_RX- | NC                      |  | -             | -    |
| S34 | GND                          | GND                     |  | Power         | 0    |
| S35 | USB4+                        | NC                      |  | -             | -    |
| S36 | USB4-                        | NC                      |  | -             | -    |
| S37 | USB3_VBUS_DET                | USB3_VBUS_DETECT        |  | Input         | 5V   |
| S38 | AUDIO_MCK                    | SOC_GPIO_122_MI2S_MCLK  |  | Input         | 1.8V |
| S39 | I2S0_LRCK                    | SOC_GPIO_109_MI2S_WS    |  | Input         | 1.8V |
| S40 | I2S0_SDOUT                   | SOC_GPIO_111_MI2S_DATA1 |  | Bidirectional | 1.8V |
| S41 | I2S0_SDIN                    | SOC_GPIO_110_MI2S_DATA0 |  | Bidirectional | 1.8V |
| S42 | I2S0_CK                      | SOC_GPIO_108_MI2S_SCK   |  | Input         | 1.8V |
| S43 | ESPI_ALERT0#                 | NC                      |  | -             | -    |
| S44 | ESPI_ALERT1#                 | NC                      |  | -             | -    |
| S45 | MDIO_CLK                     | RGMII_MDC               |  | Output        | 1.8V |
| S46 | MDIO_DAT                     | RGMII_MDIO              |  | Bidirectional | 1.8V |

|     |                                               |                       |  |               |      |
|-----|-----------------------------------------------|-----------------------|--|---------------|------|
| S47 | GND                                           | GND                   |  | Power         | 0    |
| S48 | I2C_GP_CK                                     | SOC_AUX_SCL_S4A_1P8   |  | Output        | 1.8V |
| S49 | I2C_GP_DAT                                    | SOC_AUX_SDA_S4A_1P8   |  | Bidirectional | 1.8V |
| S50 | I2S2_LRCK /<br>HDA_SYNC /<br><b>SNDW_CLK1</b> | SSC_MI2S_WS_S4A_1P8   |  | Output        | 1.8V |
| S51 | I2S2_SDO /<br>HDA_SDO /<br><b>SNDW_DAT1</b>   | SSC_MI2S_DOUT_S4A_1P8 |  | Input         | 1.8V |
| S52 | I2S2_SDIN /<br>HDA_SDI /<br><b>SNDW_DAT0</b>  | SSC_MI2S_DIN_S4A_1P8  |  | Output        | 1.8V |
| S53 | I2S2_CK /<br>HDA_CK /<br><b>SNDW_CLK0</b>     | SSC_MI2S_SCK_S4A_1P8  |  | Output        | 1.8V |
| S54 | SATA_ACT#                                     | NC                    |  | -             | -    |
| S55 | USB5_EN_OC#                                   | NC                    |  | -             | -    |
| S56 | ESPI_IO_2 /<br>QSPI_IO_2                      | NC                    |  | -             | -    |
| S57 | ESPI_IO_3 /<br>QSPI_IO_3                      | NC                    |  | -             | -    |
| S58 | ESPI_RESET#                                   | NC                    |  | -             | -    |
| S59 | USB5+                                         | NC                    |  | -             | -    |
| S60 | USB5-                                         | NC                    |  | -             | -    |
| S61 | GND                                           | GND                   |  | Power         | 0    |
| S62 | USB3_SSTX+                                    | NC                    |  | -             | -    |
| S63 | USB3_SSTX-                                    | NC                    |  | -             | -    |

|     |                              |               |  |               |        |
|-----|------------------------------|---------------|--|---------------|--------|
| S64 | GND                          | GND           |  | Power         | 0      |
| S65 | USB3_SSRX+                   | NC            |  | -             | -      |
| S66 | USB3_SSRX-                   | NC            |  | -             | -      |
| S67 | GND                          | GND           |  | Power         | 0      |
| S68 | USB3+                        | USB1_HS_DP    |  | Bidirectional | ±400mV |
| S69 | USB3-                        | USB1_HS_DM    |  | Bidirectional | ±400mV |
| S70 | GND                          | GND           |  | Power         | 0      |
| S71 | USB2_SSTX+                   | USB0_SS_TX0_P |  | Bidirectional | ±1.2V  |
| S72 | USB2_SSTX-                   | USB0_SS_TX0_M |  | Bidirectional | ±1.2V  |
| S73 | GND                          | GND           |  | Power         | 0      |
| S74 | USB2_SSRX+                   | USB0_SS_RX0_P |  | Bidirectional | ±1.2V  |
| S75 | USB2_SSRX-                   | USB0_SS_RX0_M |  | Bidirectional | ±1.2V  |
| S76 | PCIE_B_RST#                  | NC            |  | -             | -      |
| key |                              |               |  |               |        |
| S77 | PCIE_C_RST#                  | NC            |  | -             | -      |
| S78 | PCIE_C_RX+ /<br>SERDES_1_RX+ | NC            |  | -             | -      |
| S79 | PCIE_C_RX- /<br>SERDES_1_RX- | NC            |  | -             | -      |
| S80 | GND                          | GND           |  | Power         | 0      |

|     |                              |                    |  |                 |       |
|-----|------------------------------|--------------------|--|-----------------|-------|
| S81 | PCIE_C_TX+ /<br>SERDES_1_TX+ | NC                 |  | -               | -     |
| S82 | PCIE_C_TX- /<br>SERDES_1_TX- | NC                 |  | -               | -     |
| S83 | GND                          | GND                |  | Power           | 0     |
| S84 | PCIE_B_REFCK+                | NC                 |  | -               | -     |
| S85 | PCIE_B_REFCK-                | NC                 |  | -               | -     |
| S86 | GND                          | GND                |  | Power           | 0     |
| S87 | PCIE_B_RX+                   | NC                 |  | -               | -     |
| S88 | PCIE_B_RX-                   | NC                 |  | -               | -     |
| S89 | GND                          | GND                |  | Power           | 0     |
| S90 | PCIE_B_TX+                   | NC                 |  | -               | -     |
| S91 | PCIE_B_TX-                   | NC                 |  | -               | -     |
| S92 | GND                          | GND                |  | Power           | 0     |
| S93 | DP0_LANE0+                   | DP_LANE0_P         |  | Bidirecti<br>on | ±1.2V |
| S94 | DP0_LANE0-                   | DP_LANE0_M         |  | Bidirecti<br>on | ±1.2V |
| S95 | DP0_AUX_SEL                  | SMARC_DP_AUX_SEL   |  | Output          | 1.8V  |
| S96 | DP0_LANE1+                   | DP_LANE1_P         |  | Bidirecti<br>on | ±1.2V |
| S97 | DP0_LANE1-                   | DP_LANE1_M         |  | Bidirecti<br>on | ±1.2V |
| S98 | DP0_HPD                      | DP_HOT_PLUG_DETECT |  | Input           | 1.8V  |
| S99 | DP0_LANE2+                   | DP_LANE2_P         |  | Bidirecti<br>on | ±1.2V |

|      |                                         |                |                                                    |               |        |
|------|-----------------------------------------|----------------|----------------------------------------------------|---------------|--------|
| S100 | DP0_LANE2-                              | DP_LANE2_M     |                                                    | Bidirectional | ±1.2V  |
| S101 | GND                                     | GND            |                                                    | Power         | 0      |
| S102 | DP0_LANE3+                              | DP_LANE3_P     |                                                    | Bidirectional | ±1.2V  |
| S103 | DP0_LANE3-                              | DP_LANE3_M     |                                                    | Bidirectional | ±1.2V  |
| S104 | USB3_OTG_ID                             | USB3_OTG_ID    |                                                    | Bidirectional | 3.3V   |
| S105 | DP0_AUX+                                | DP_AUX_P       |                                                    | Bidirectional | ±1.2V  |
| S106 | DP0_AUX-                                | DP_AUX_M       |                                                    | Bidirectional | ±1.2V  |
| S107 | LCD1_BKLT_EN                            | LVDS_B_BKLT_EN |                                                    | Output        | 1.8V   |
| S108 | LVDS1_CK+ /<br>eDP1_AUX+ /<br>DSI1_CLK+ | LVDS_B_CLK_P   | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S109 | LVDS1_CK- /<br>eDP1_AUX- /<br>DSI1_CLK- | LVDS_B_CLK_N   | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S110 | GND                                     | GND            |                                                    | Power         | 0      |
| S111 | LVDS1_0+ /<br>eDP1_TX0+ /<br>DSI1_D0+   | LVDS_B_LANE0_P | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S112 | LVDS1_0- /<br>eDP1_TX0- /<br>DSI1_D0-   | LVDS_B_LANE0_N | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |

|      |                                       |                     |                                                    |        |        |
|------|---------------------------------------|---------------------|----------------------------------------------------|--------|--------|
| S113 | eDP1_HPD /<br>DSI1_TE                 | LVDS_B_HOT_PLUG_DET |                                                    | Output | 1.8V   |
| S114 | LVDS1_1+ /<br>eDP1_TX1+ /<br>DSI1_D1+ | LVDS_B_LANE1_P      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S115 | LVDS1_1- /<br>eDP1_TX1- /<br>DSI1_D1- | LVDS_B_LANE1_N      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S116 | LCD1_VDD_EN                           | LCD1_VDD_EN         | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | 1.8V   |
| S117 | LVDS1_2+ /<br>eDP1_TX2+ /<br>DSI1_D2+ | LVDS_B_LANE2_P      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S118 | LVDS1_2- /<br>eDP1_TX2- /<br>DSI1_D2- | LVDS_B_LANE2_N      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S119 | GND                                   | GND                 |                                                    | Power  | 0      |
| S120 | LVDS1_3+ /<br>eDP1_TX3+ /<br>DSI1_D3+ | LVDS_B_LANE3_P      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S121 | LVDS1_3- /<br>eDP1_TX3- /<br>DSI1_D3- | LVDS_B_LANE3_N      | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |

|      |                                       |                      |                                                    |        |        |
|------|---------------------------------------|----------------------|----------------------------------------------------|--------|--------|
| S122 | LCD1_BKLT_PW<br>M                     | LCD1_BKLT_PWM        |                                                    | Input  | 1.8V   |
| S123 | GPIO13                                | SOC_GPIO_26_S4A_1P8  |                                                    | Output | 1.8V   |
| S124 | GND                                   | GND                  |                                                    | Power  | 0      |
| S125 | LVDS0_0+ /<br>eDP0_TX0+ /<br>DSI0_D0+ | LVDS_A_LANE0_P       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S126 | LVDS0_0- /<br>eDP0_TX0- /<br>DSI0_D0- | LVDS_A_LANE0_N       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S127 | LCD0_BKLT_EN                          | LVDS_A_BKLT_EN       |                                                    | Input  | 1.8V   |
| S128 | LVDS0_1+ /<br>eDP0_TX1+ /<br>DSI0_D1+ | LVDS_A_LANE1_P       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S129 | LVDS0_1- /<br>eDP0_TX1- /<br>DSI0_D1- | LVDS_A_LANE1_N       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S130 | GND                                   | GND                  |                                                    | Power  | 0      |
| S131 | LVDS0_2+ /<br>eDP0_TX2+ /<br>DSI0_D2+ | LVDS_A_LANE2_P       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S132 | LVDS0_2- /<br>eDP0_TX2- /<br>DSI0_D2- | LVDS_A_LANE2_N       | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output | ±600mV |
| S133 | LCD0_VDD_EN                           | DISP0_PWR_EN_S4A_1P8 |                                                    | Output | 1.8V   |

|      |                                         |                               |                                                    |               |        |
|------|-----------------------------------------|-------------------------------|----------------------------------------------------|---------------|--------|
| S134 | LVDS0_CK+ /<br>eDP0_AUX+ /<br>DSI0_CLK+ | LVDS_A_CLK_P                  | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S135 | LVDS0_CK- /<br>eDP0_AUX- /<br>DSI0_CLK- | LVDS_A_CLK_N                  | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S136 | GND                                     | GND                           |                                                    | Power         | 0      |
| S137 | LVDS0_3+ /<br>eDP0_TX3+ /<br>DSI0_D3+   | LVDS_A_LANE3_P                | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S138 | LVDS0_3- /<br>eDP0_TX3- /<br>DSI0_D3-   | LVDS_A_LANE3_N                | From DSI to<br>LVDS converter<br>SN65DSI84ZX<br>HR | Output        | ±600mV |
| S139 | I2C_LCD_CK                              | DISP_SCL_S4A_1P8              |                                                    | Output        | 1.8V   |
| S140 | I2C_LCD_DAT                             | DISP_SDA_S4A_1P8              |                                                    | Bidirectional | 1.8V   |
| S141 | LCD0_BKLT_PW<br>M                       | LCD0_BKLT_PWM                 |                                                    | Output        | 1.8V   |
| S142 | GPIO12                                  | DISP0_RST_S4A_1P8_N           |                                                    | Output        | 1.8V   |
| S143 | GND                                     | GND                           |                                                    | Power         | 0      |
| S144 | eDP0_HPD /<br>DSI0_TE                   | LVDS_A_HOT_PLUG_DET           |                                                    | Output        | 1.8V   |
| S145 | WDT_TIME_OUT#                           | SOC_GPIO106_WDT_TIME_<br>OUT# |                                                    | Output        | 1.8V   |
| S146 | PCIE_WAKE#                              | PCIE_WAKE#                    |                                                    | Output        | 3.3V   |
| S147 | VDD_RTC                                 | VCOIN_PMIC                    |                                                    | Power         | 3.3V   |

|      |                 |                            |  |        |      |
|------|-----------------|----------------------------|--|--------|------|
| S148 | LID#            | SOC_GPIO_51_LID#           |  | Input  | 1.8V |
| S149 | SLEEP#          | SOC_GPIO_50_SLEEP#         |  | Input  | 1.8V |
| S150 | VIN_PWR_BAD#    | VIN_PWR_BAD#               |  | Input  | 1.8V |
| S151 | CHARGING#       | SOC_GPIO_107_CHARGING#     |  | Input  | 1.8V |
| S152 | CHARGER_PRSN T# | SOC_GPIO_62_CHARGER_PRSNT# |  | Input  | 1.8V |
| S153 | CARRIER_STBY#   | SOC_GPIO_52_CARRIER_STBY#  |  | Output | 1.8V |
| S154 | CARRIER_PWR_ON  | CARRIER_PWR_ON             |  | Output | 1.8V |
| S155 | FORCE_RECOV#    | FORCED_USB_BOOT            |  | Input  | 1.8V |
| S156 | BATLOW#         | SOC_GPIO_80_BATLOW#        |  | Input  | 1.8V |
| S157 | TEST#           | NC                         |  | -      | -    |
| S158 | GND             | GND                        |  | Power  | 0    |

Note:

- Input means input to SoM.
- Output means output from SoM.