

RM50xQ Series+IPQ8074A

Reference Design

5G Module Series

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Status: Released



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About the Document

Revision History

Version	Date	Author	Description
1.0	2020-09-15	Oscar LIU/ Jumping HE	Initial
1.1	2021-04-12	Norton ZHANG	<ol style="list-style-type: none">1. Updated document's application scope form RM500Q series to RM50xQ series.2. Updated VCC reference circuit.3. Updated pin name of pin 67 from RESET_N to RESET#; pins 2, 4, 70, 72, and 74 from VCC_MODULE to VCC; pin 6 from FULL_CARD_PWR_OFF# to FULL_CARD_POWER_OFF#;
1.2	2022-07-23	Jada LIN	Updated the VoLTE solution: connect IPQ8074A's PCM rather than the module's PCM to SLIC (Sheet 3 & Sheet 4 & Sheet 6).

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1 Reference Design

1.1. Introduction

This document provides the reference designs for RM50xQ series to realize Wi-Fi function with the chip IPQ8074A, and to realize VoLTE function with Subscriber Line Interface Circuit (SLIC) device, including that for power supply, connection between IPQ8074A and the module, (U)SIM interfaces, and VoLTE solution.

The document is applicable to the following modules:

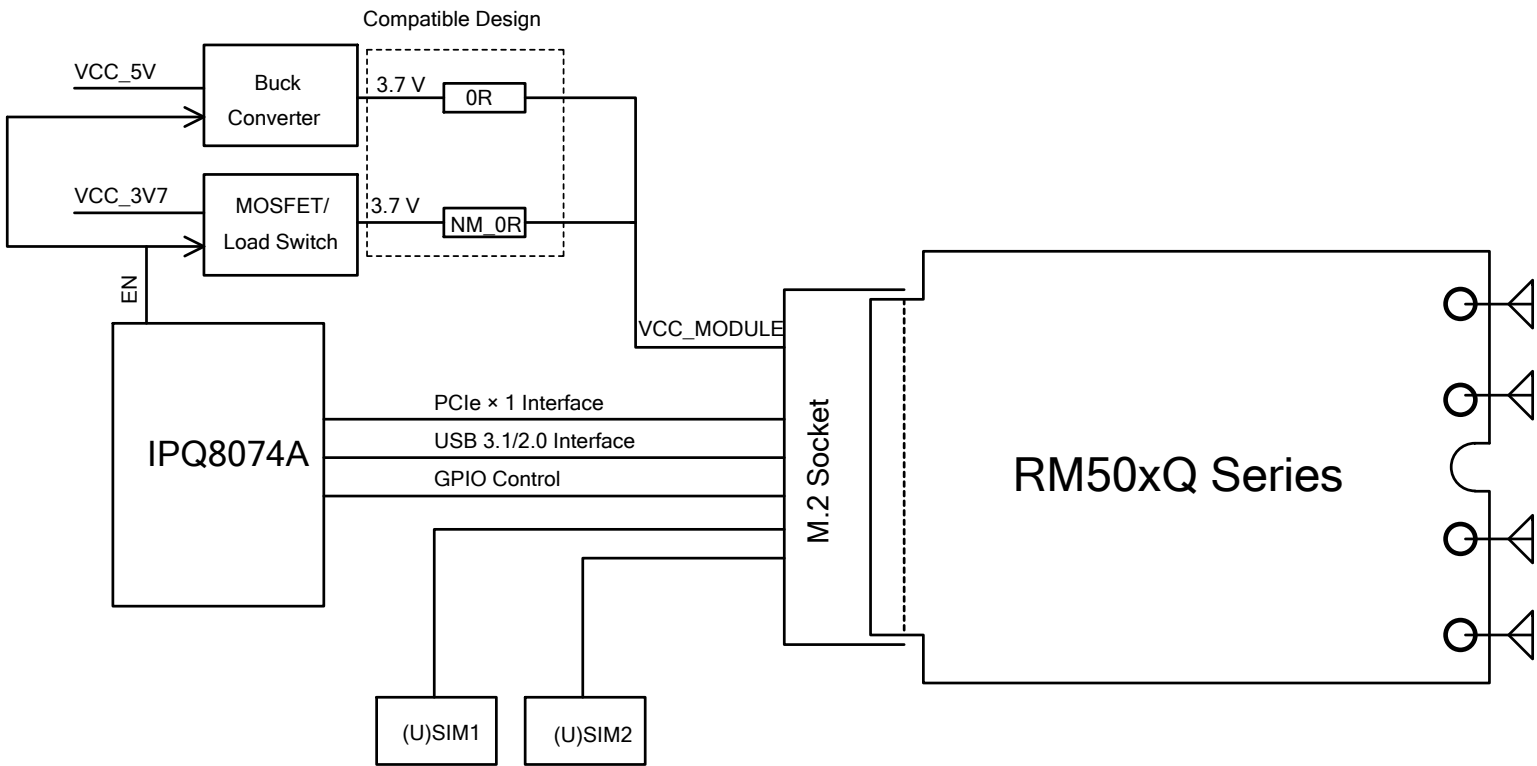
Table 1: Applicable Modules

Applicable Modules	
RM500Q-GL	
RM50xQ-AE	RM500Q-AE
	RM502Q-AE
	RM505Q-AE
RM500Q-CN	

1.2. Schematics

The schematics illustrated in the following pages are provided for reference only.

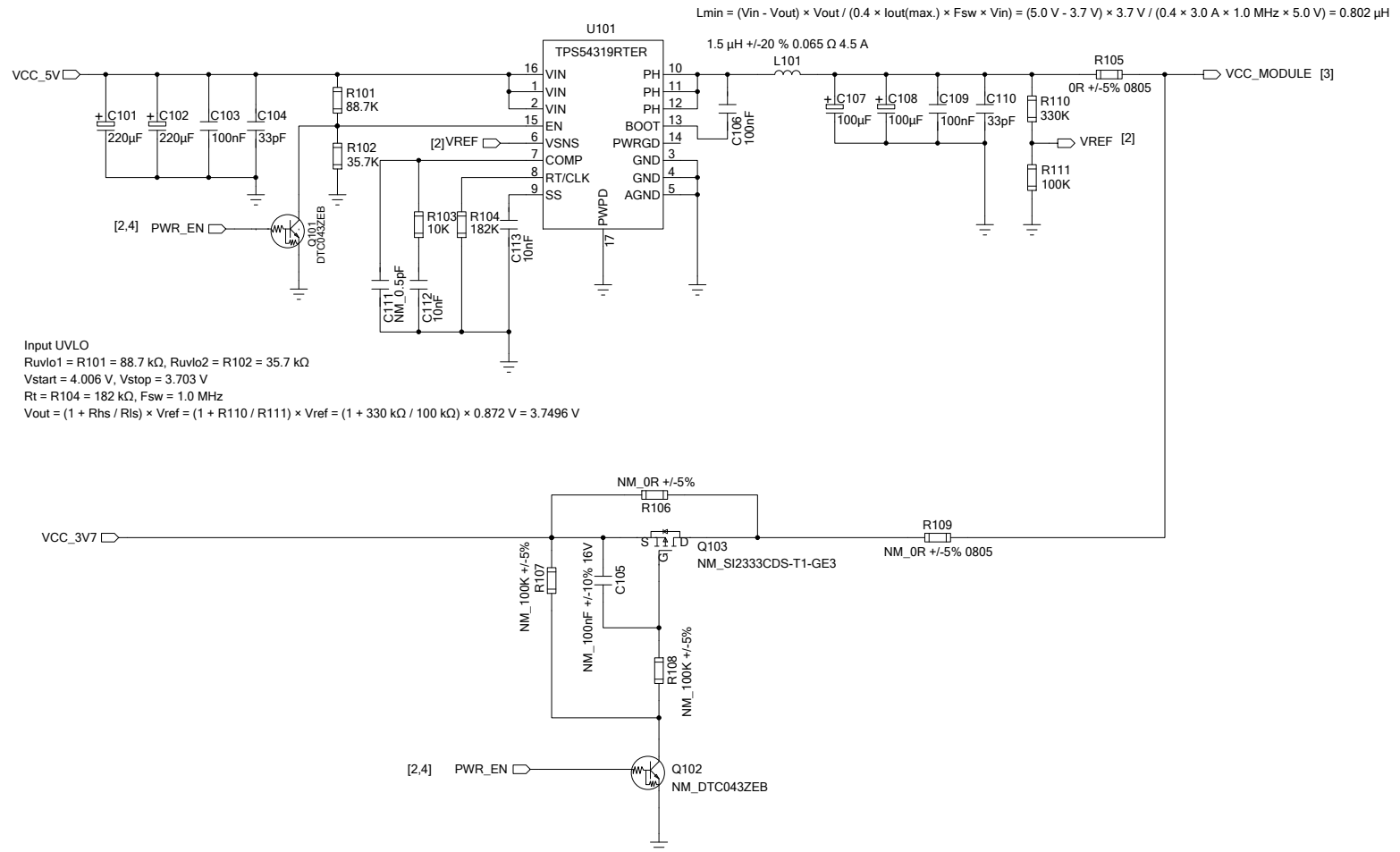
Block Diagram



NOTE:
The location of antenna connectors is for reference only. For more details about antenna connectors, see the Hardware Design of the corresponding module.

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Power Supply Design



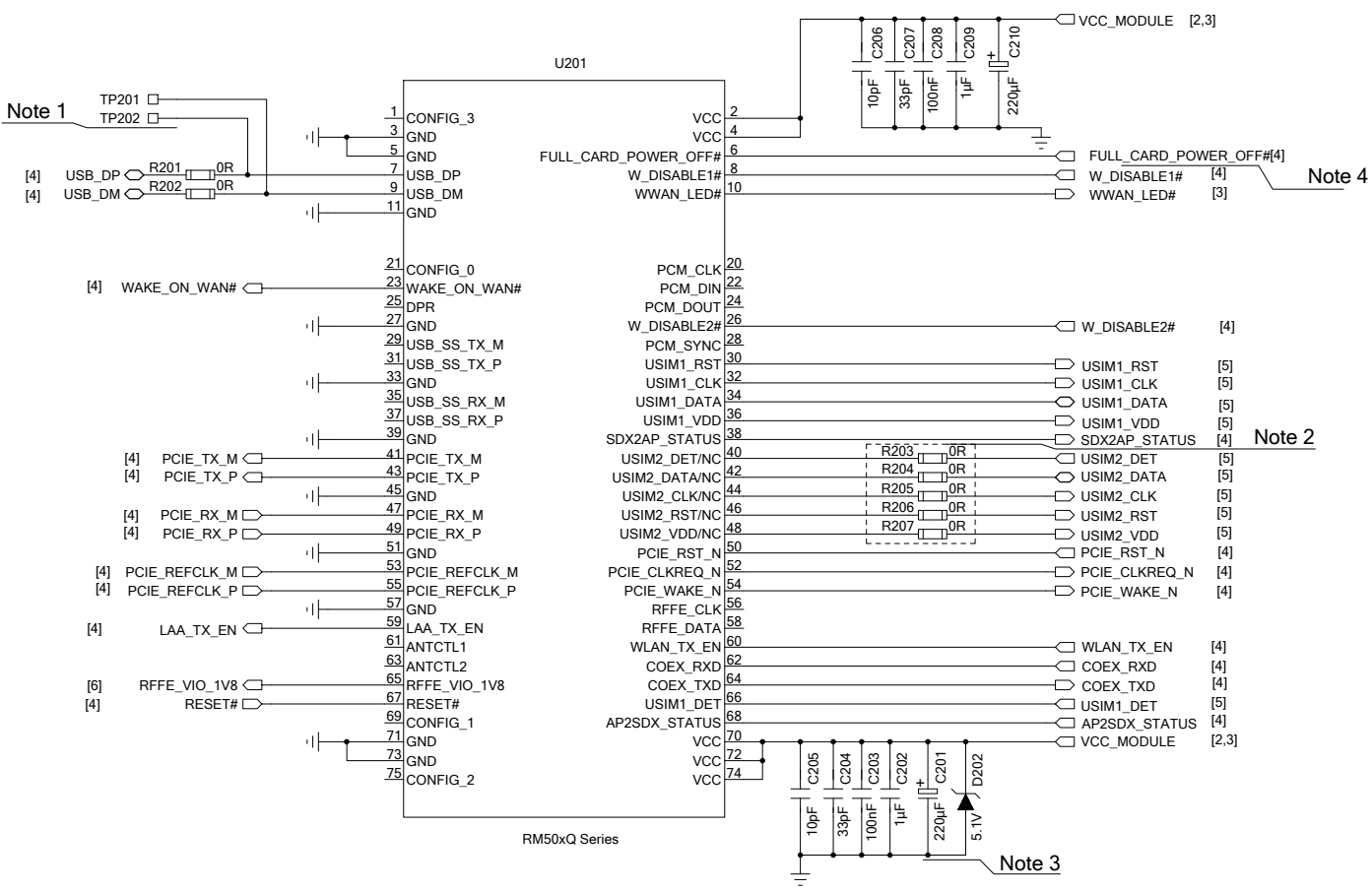
NOTE:

1. The power supply must be able to provide sufficient current up to 3 A or higher.
2. A compatible power supply design for the module is recommended.

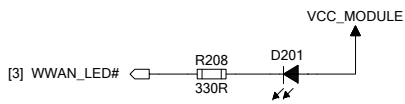
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Connectivity Between IPQ8074A and RM50xQ (Part 1)



FULL_CARD_POWER_OFF#	Module
HIGH	Turn On
LOW	Turn Off

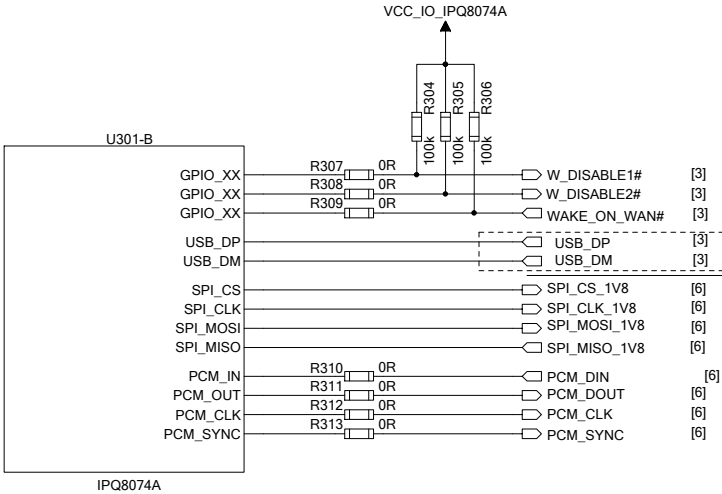
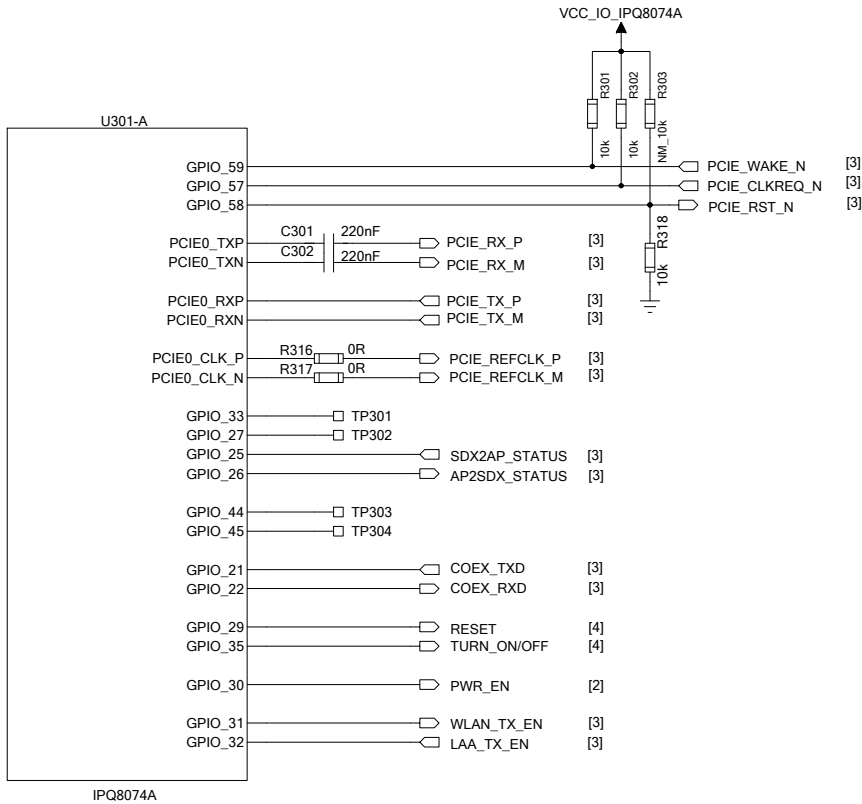


RM50xQ Series	
Module	Pin 40, 42, 44, 46, 48
RM500Q-GL	(U)SIM2 Interface
RM500Q-AE	NC
RM502Q-AE	NC
RM505Q-AE	(U)SIM2 Interface
RM500Q-CN	(U)SIM2 Interface

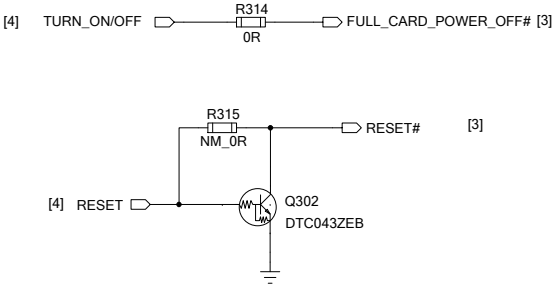
- NOTE:**
- It is recommended to reserve test points for the firmware upgrade over USB 2.0 interface and to minimize the stub length of USB test signals.
 - R203 to R207 should be placed close to the M.2 socket. If the module has a built-in eSIM, R203 to R207 should not be mounted.
RM500Q-AE and RM502Q-AE do not support (U)SIM2 interface.
 - It is recommended to use a zener diode D202 with a reverse zener voltage of 5.1 V and it should be placed close to the module pin.
 - Use a IPQ8074A GPIO to control FULL_CARD_POWER_OFF# of the module.

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Connectivity Between IPQ8074A and RM50xQ (Part 2)



Note 1

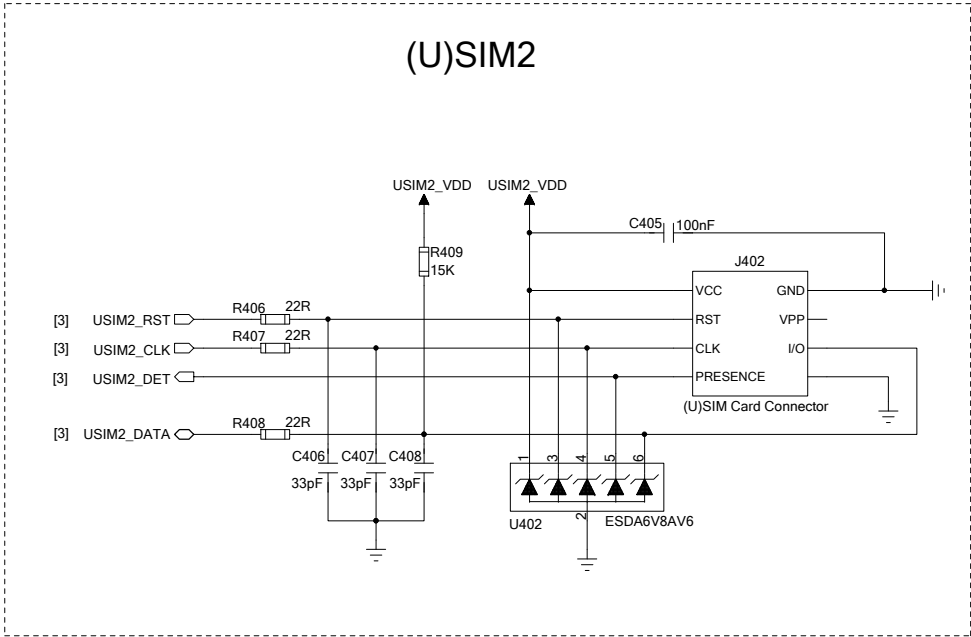
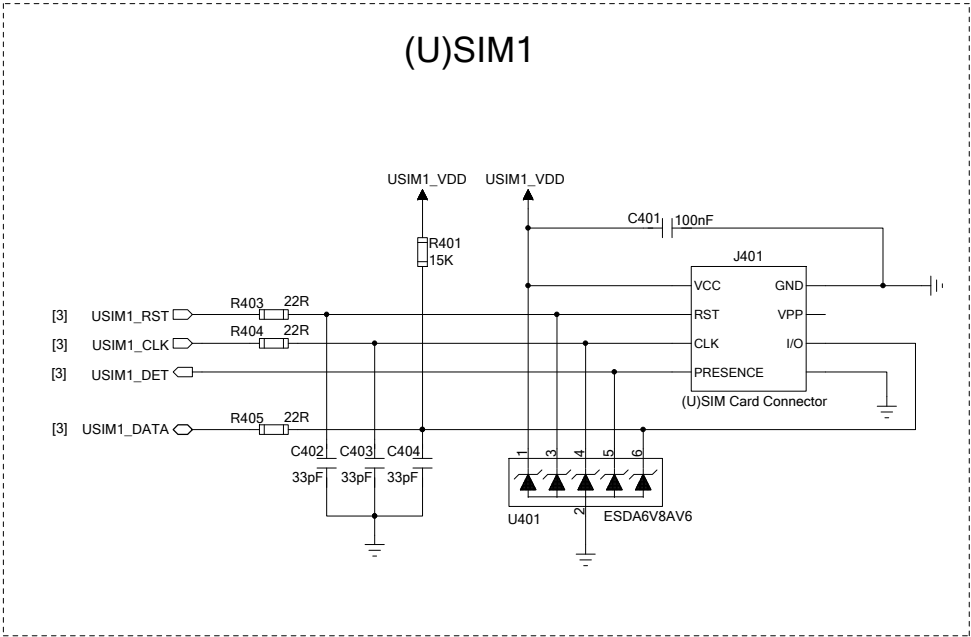


NOTE:

1. USB 2.0 interface is used for firmware upgrade.
2. The differential impedance of PCIe signal traces should be controlled to 85 Ω.

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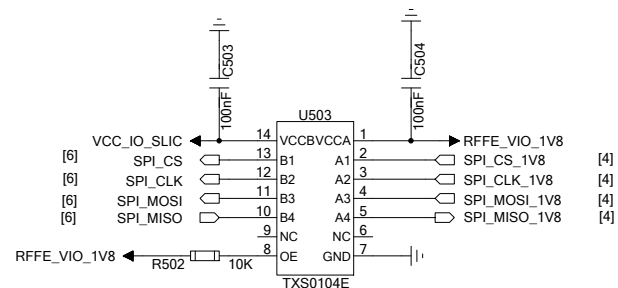
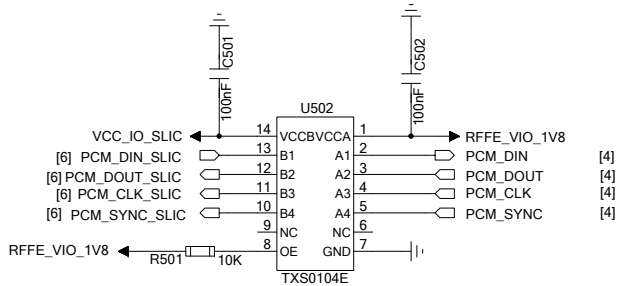
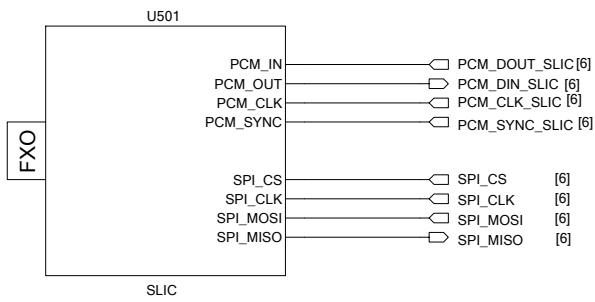
(U)SIM Interface Design



- NOTE:**
1. The decoupling capacitors of (U)SIM signals and (U)SIM related resistors must be placed close to (U)SIM card connectors.
 2. The module provides the input pin(s) USIM_DET to detect (U)SIM cards.
 - 1) A normally short-circuited (U)SIM card connector is used in this reference design, and high-logic-level detection is supported. For more details, see the corresponding Hardware Design.
 - 2) This pin is pulled LOW by default, and will be internally pulled up to 1.8 V by software configuration only when (U)SIM hot-plug is enabled by AT+QSIMDET.
 3. R403-R408 are applied to suppress the EMI such as spurious transmission.
 4. A ESD diode array with a junction capacitance of lower than 10 pF should be placed as close to the (U)SIM card connector as possible for ESD protection.
 5. The (U)SIM card connector should be placed close to the M.2 socket, because a long trace may lead to wave distortion, which affects the signal quality.

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VoLTE Solution



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