



SIM83xxx_SIM82xxx Series module with WLAN Coexistence Guidelines

5G Module

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1 Introduction

This document is description SIMCom 5G module WWAN with WLAN coexistence guidelines. Currently, the main challenges of coexistence of WWAN and WLAN are as follows:

1. 5G NR challenges

- 1) Use of new frequency bands: In some cases, it is very close to existing bands used by WLAN (n77, n78, most challenging n79).
- 2) Use of much larger channel bandwidth resulting in a higher level of spectral emissions into bands used by WLAN (up to 100 MHz, for example, n41).

2. 2.4 GHz WLAN/Bluetooth challenges

- 1) Mainly affected by wide bandwidth used in adjacent WWAN bands (n41 and n40)

About WWAN with WLAN coexistence, SIMCom 5G module just support Qualcomm platform WIFI module, not support the third method platform WIFI module.

About SIMCom 5G M2 module hardware not support coexistence UART (pin62, pin64) by default, for more details, please contact SIMCom support team.

About SIMCom SIM8260G and SIM8380G M2 module hardware not support coexistence WL_TO_LAA_TX_EN (pin60) by default, for more details, please contact SIMCom support team.

2 WLAN and WWAN Coexistence

2.1 WLAN 2.4GHz and B40/n40/B41/n41 coexistence

Because B40/n40/B41/n41 and WLAN 2.4GHz are small apart in the spectrum and n40/n41 will increase out of band spurious due to the increase of bandwidth when it works in 100MHz bandwidth, thus affecting the work of WLAN.

The following figure is WLAN 2.4GHz adjacent band B40/n40, B41/n41 band working frequency range.

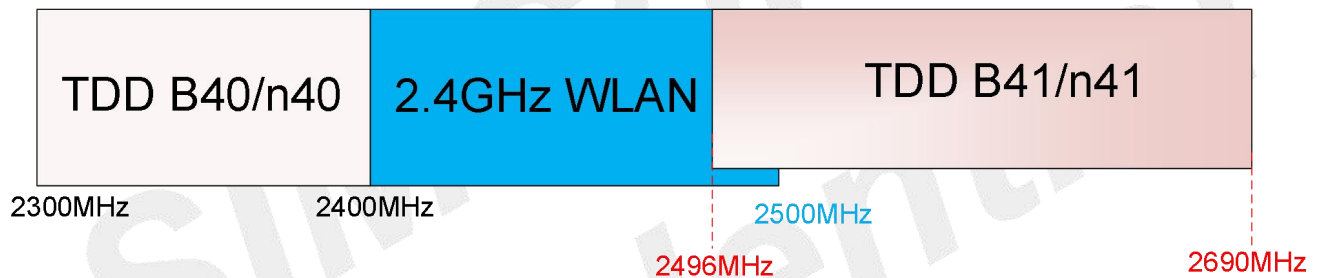


Figure 1: WLAN 2.4GHz adjacent band B40/n40 and B41/n41 band working frequency range

Coexistence mechanism:

- ① WLAN 2.4GHz starts the channel avoidance mode. By monitoring the interference of the current channel, select a suitable and clean working channel to avoid the impact of external connection on WLAN.
- ② WLAN 2.4GHz power back-off. Put WLAN 2.4GHz transmits power back-off, keep enough isolation degree, and make sure B40/n40/B41/n41 normal working.
- ③ B40/n40/B41/n41 power back-off. Put B40/n40/B41/n41 transmits power back-off, keep enough isolation degree, and make sure WLAN normal working 2.4GHz.

2.2 WLAN 2.4GHz and NR n79 coexistence

The second harmonic of WLAN 2.4GHz can be falls in the band of n79, which may affect the reception performance of n79. The following figure is WLAN 2.4GHz and n79 working frequency range.

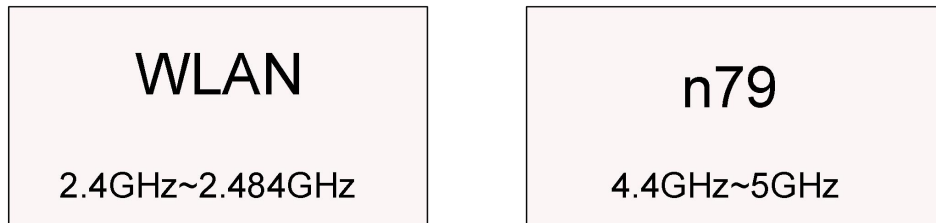


Figure 2: WLAN 2.4GHz and n79 working frequency range

Coexistence mechanism:

① Filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic, which falls into n79 Rx.

2.3 WLAN 5GHz and LAA B46 coexistence

As shown in the following figure, the LTE LAA band and WLAN 5GHz is coincident, can interfere LTE LAA DL receive and even damage LAA receiver LNA, when WLNA 5GHz transmits above a power threshold.

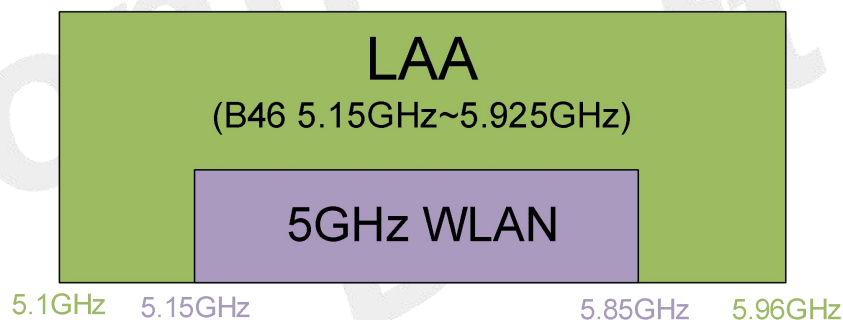


Figure 3: LTE LAA band and WLAN 5GHz working frequency range

Coexistence mechanism:

① When the LTE LAA LNA is working, change WLAN working mode to 2.4GHz, and protect LTE LAA receiver's LNA

② When the WLAN 5GHz is working, put LTE LAA receiver's LNA in isolation protect mode.

2.4 WLAN 5GHz and NR n79 coexistence

The frequency interval between n79 and WLAN 5GHz is only 150MHz. Because both of them are high frequency and have large band width, there is no ready-made and effective filter in hardware to isolate them.

If not suitable isolation protection measure, when n79 transmits above WLAN LNA input power threshold without protection, 5GHz WLAN receiver's LNA may suffer permanent damage.

If not suitable isolation protection measure, when WLAN 5GHz transmits above n79 receiver LNA input power threshold without protection, n79 receiver's LNA may suffer permanent damage.



Figure 4: NR n79 band and WLAN 5GHz working frequency range

Coexistence mechanism:

①When the n79 transmits:

- 1) 5G WLAN LNA blanking/protection when n79 transmits above a threshold
- 2) Mutual exclusivity between traffic on n79 and connection on 5 GHz WLAN

②when the WLAN 5GHz transmits:

- 1) n79 LNA blanking/protection when 5 GHz WLAN transmits above a threshold
- 2) Mutual exclusivity between traffic on n79 and connection on 5 GHz WLAN

2.5 SIMCom 5G module with WLAN Coexistence Diagram

The following figures are SIM82xxx_SIM83xxx series module with WLAN coexistence connection diagram.

If use SIM8262A-M2 module R1 is SMT

If use SIM8262E-M2/SIM8260C-M2 module R2 is SMT

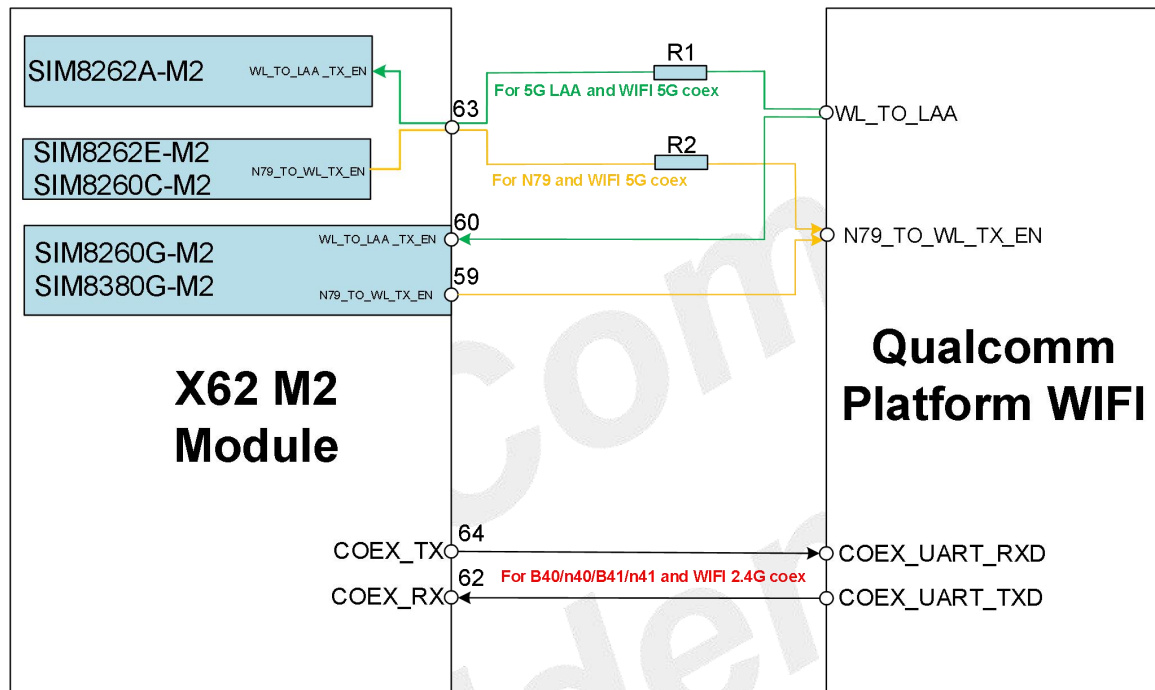


Figure 5: SIMCom X62 platform M2 series module connect WIFI diagram

For SIM8262A-M2/SIM8262E-M2/SIM8260C-M2/SIM8260G-M2/SIM8380G-M2 modules, pin64 and pin62 of module is WLAN 2.4GHz with B40/n40/B41/n41 coexistence UART signal.

For SIM8262A-M2 module, the signal of pin63 WL_TO_LAA_TX_EN (LTE LAA and n79 Protect, Green path) is input signal, when the WLAN is working 5GHz, and put module's LTE LAA LNA and n79 LNA in isolation protect mode by it.

For SIM8262E-M2/SIM8260C-M2 modules, the signal of pin63 N79_TO_WL_TX_EN (Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic. Because SIM8262E-M2/SIM8260C-M2 modules hardware not support LTE LAA band, so not define about LTE LAA coexistence function pin.

For SIM8260G-M2/SIM8380G-M2 modules, the signal of pin60 WL_TO_LAA_TX_EN (Green path) is input signal, when the WLAN is working 5GHz, and put module's LTE LAA LNA in isolation protect mode by it. The signal of pin59 N79_TO_WL_TX_EN (Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it.

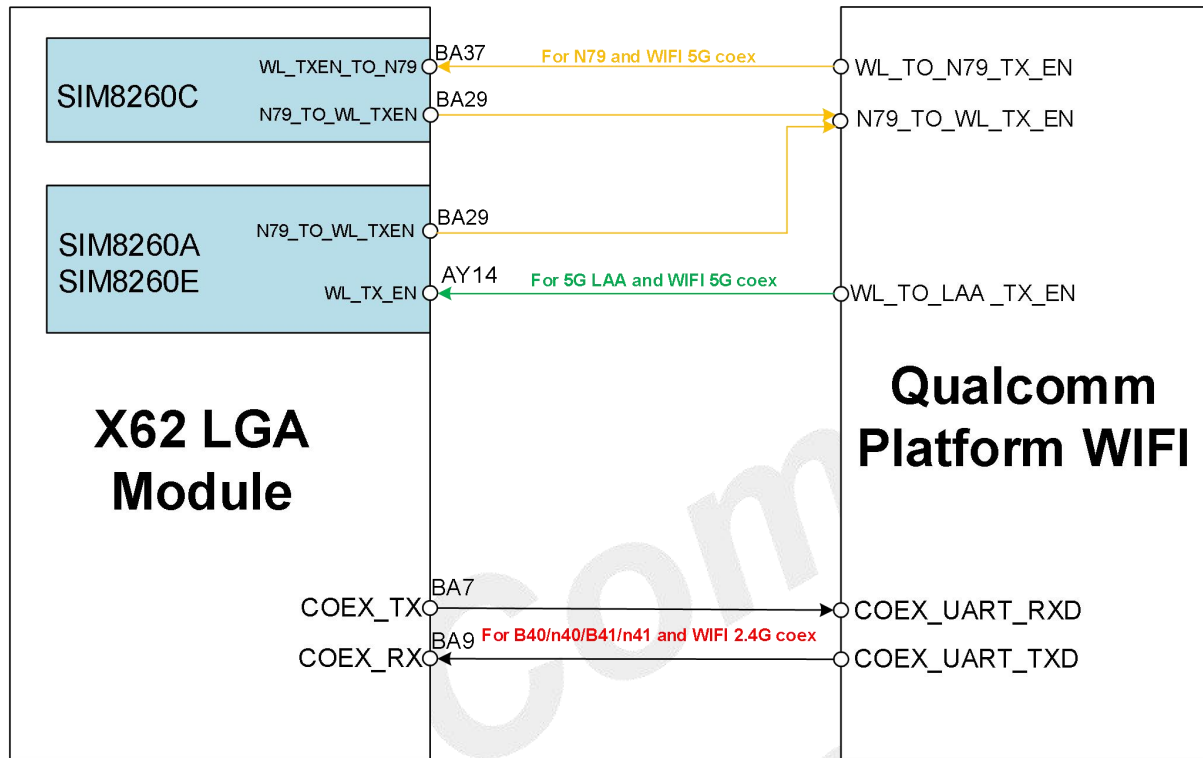


Figure 6:SIMCom X62 platform LGA series module connect WIFI diagram

For SIM8260C/SIM8260A/SIM8260E modules, pin BA7 and pin BA9 of module is WLAN 2.4GHz with B40/n40/B41/n41 coexistence UART signal.

For SIM8260C module, the signal of pin BA29 N79_TO_WL_TX_EN (Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic.

The signal of pin BA37 WL_TXEN_TO_N79 (Yellow path) is input signal, when the WLAN is working 5GHz, and put module n79 LNA in isolation protect mode by it.

Because SIM8260C module hardware not support LTE LAA band, so not define about LTE LAA coexistence function pin.

For SIM8260A/SIM8260E modules, the signal of pin BA29 N79_TO_WL_TX_EN (Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic.

The signal of pin AY14 WL_TX_EN (Green path) is input signal, when the WLAN is working 5GHz, and put module LTE LAA LNA in isolation protect mode by it.

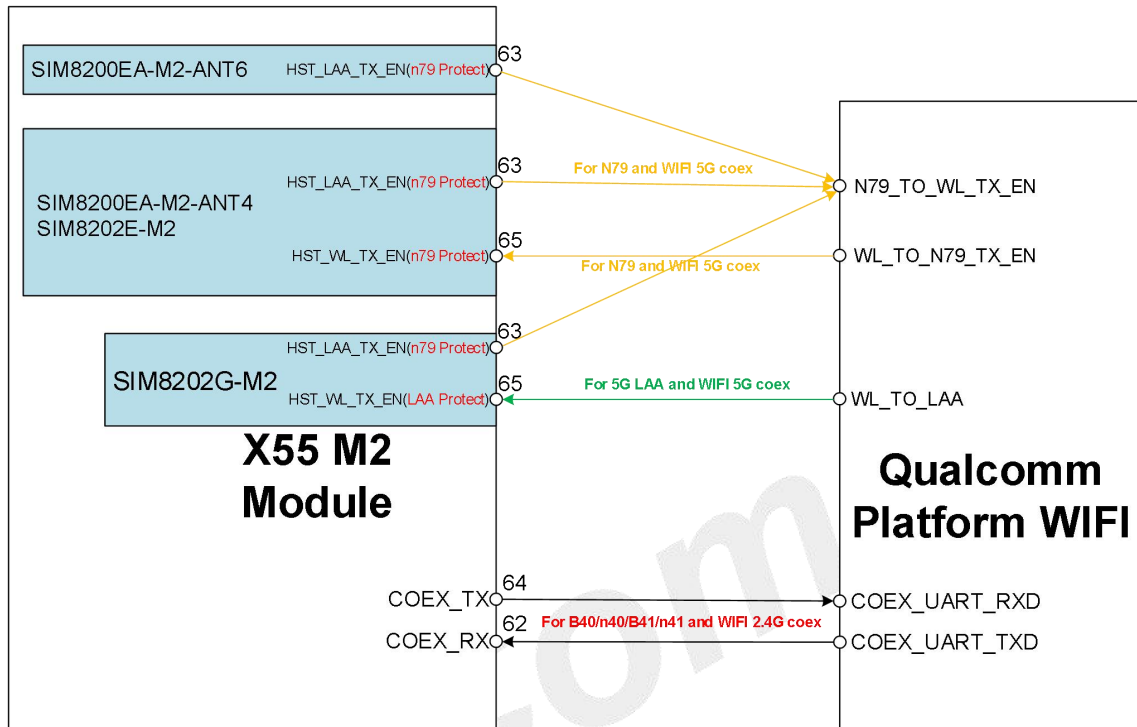


Figure 7: SIMCom X55 platform M2 series module connect WIFI diagram

For SIM8200EA-M2-ANT6/SIM8200EA-M2-ANT4/SIM8202G-M2/SIM8202E-M2 modules, pin64 and pin62 of module is WLAN 2.4GHz with B40/n40/B41/n41 coexistence UART signal.

For SIM8200EA-M2-ANT6 module, the signal of pin63 HST_LAA_TX_EN (**n79 protect, Yellow path**) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic. Because SIM8200EA-M2-ANT6 module hardware not support LTE LAA band, so not define about LTE LAA coexistence function pin.

For SIM8200EA-M2-ANT4/SIM8202E-M2 modules, the signal of pin63 HST_LAA_TX_EN (**n79 protect, Yellow path**) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic.

The signal of pin65 HST_WL_TX_EN (**n79 protect, yellow path**) is input signal, when the WLAN is working 5GHz, and put module n79 LNA in isolation protect mode by it.

For SIM8202G-M2 module, the signal of pin63 HST_LAA_TX_EN (**n79 protect, Yellow path**) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic.

The signal of pin65 HST_WL_TX_EN (**LAA protect, Green path**) is input signal, when the WLAN is working 5GHz, and put module LTE LAA LNA in isolation protect mode by it.

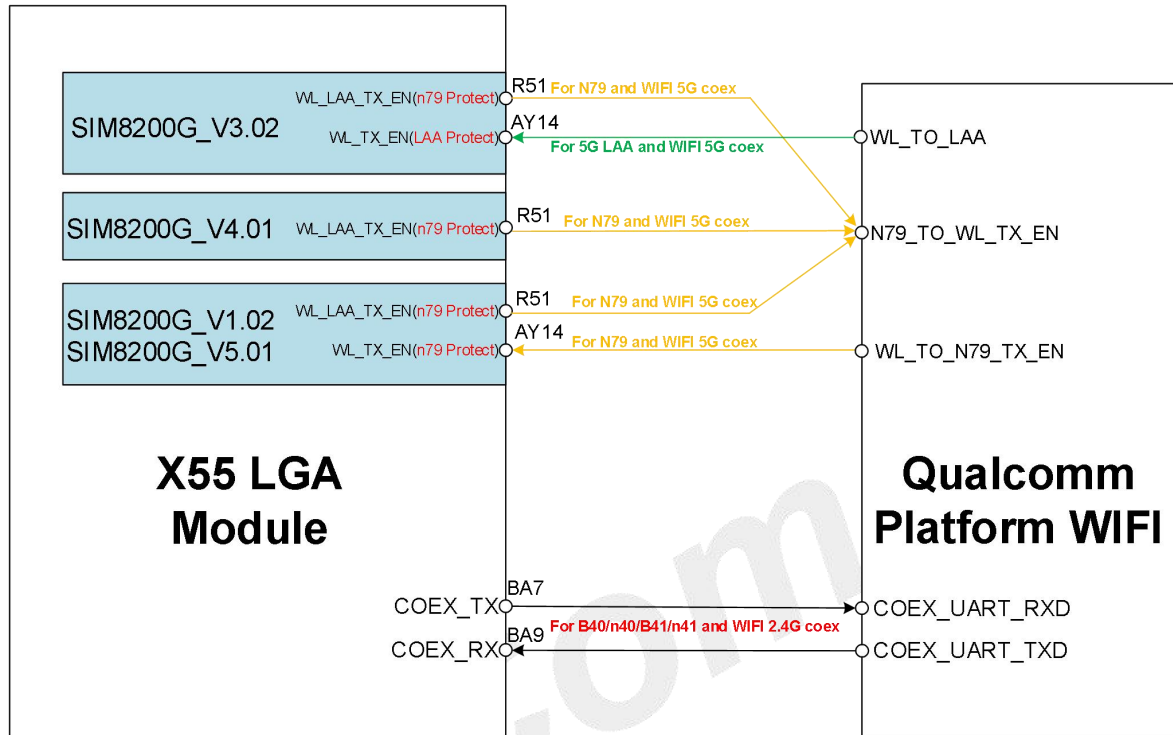


Figure 8: SIMCom X55 platform LGA series module connect WIFI diagram

For SIM8200G_V1.02/V3.02/V4.01/V5.01 modules, pin BA7 and pin BA9 of module is WLAN 2.4GHz with B40/n40/B41/n41 coexistence UART signal.

For SIM8200G_V3.02 module, the signal of pin R51 WL_LAA_TX_EN (n79 protect, Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic. The signal of pin AY14 WL_TX_EN (Green path) is input signal, when the WLAN is working 5GHz, and put module LTE LAA LNA in isolation protect mode by it.

For SIM8200G_V4.01 modules, the signal of pin R51 WL_LAA_TX_EN (n79 protect, Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic. Because SIM8200G_V4.01 module hardware not support LTE LAA band, so not define about LTE LAA coexistence function pin.

For SIM8200G_V1.02/V5.01 modules, the signal of pin R51 WL_LAA_TX_EN (n79 protect, Yellow path) is output signal, when the module RF working in n79, and change WLAN working mode to 2.4GHz by it, for WLAN 2.4GHz mode, filters are used on WLAN path to suppress the 2.4 GHz WLAN second harmonic. The signal of pin AY14 WL_TX_EN (n79 protect, Yellow path) is input signal, when the WLAN is working 5GHz, and put module n79 LNA in isolation protect mode by it. Because SIM8200G_V1.02/V5.01 modules hardware not support LTE LAA band, so not define about LTE LAA coexistence function pin.