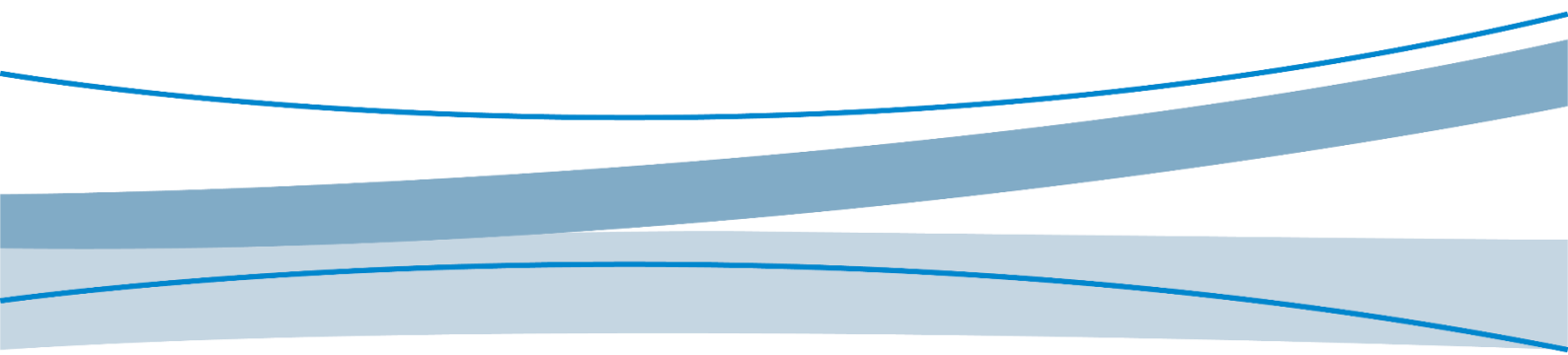




5G Module Sub6 Coexistence with WLAN Guide

V1.1



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Safety Instructions

Do not operate wireless communication products in areas where the use of radio is not recommended without proper equipment certification. These areas include environments that may generate radio interference, such as flammable and explosive environments, medical devices, aircraft or any other equipment that may be subject to any form of radio interference.

The driver or operator of any vehicle shall not operate wireless communication products while controlling the vehicle. Doing so will reduce the driver's or operator's control and operation of the vehicle, resulting in safety risks.

Wireless communication devices do not guarantee effective connection under any circumstances, such as when the (U) SIM card is invalid or the device is in arrears. In an emergency, please use the emergency call function when the device is turned on, and ensure that the device is located in an area with sufficient signal strength.

Applicable Model

No.	Applicable Model	Description
1	Qualcomm 5G platform products	NA

Change History

V1.1 (2021-12-02)	Changed the format to the new style and the version number to two-digits. Updated Applicability Model to all Qualcomm 5G platform products.
V1.0.0 (2020-04-21)	Initial version.

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1 Introduction

This document will introduce the coexistence of Qualcomm platform NR5G Sub6 and WLAN. Currently, the main challenges of coexistence of Sub6 and WLAN are as follows:

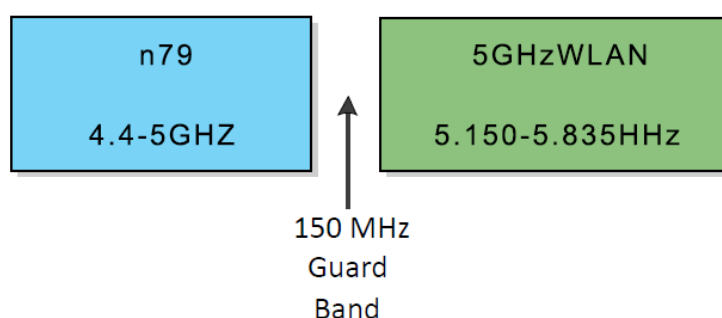
1. The spectrum interval between WLAN 5G and n79 is very close.
2. Because NR band can support 100MHz bandwidth at most, it will lead to higher out-of-band spectrum spuriousness, such as n41/77/78/79.

2 Sub6 and WLAN Coexistence Scenarios and Mechanisms

2.1 WLAN 5G and NR n79

Coexistence scenario:

From the perspective of RF spectrum, the frequency interval between n79 and WLAN 5g is only 150 MHz. Because both of them use high frequency and have large bandwidth, there is no ready-made and effective filter in hardware to isolate them.



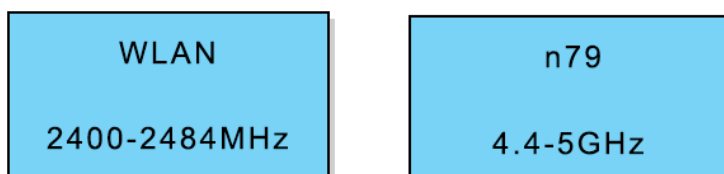
Coexistence mechanism:

1. N79 and WLAN 5G can only coexist in a mutually exclusive way. When n79 works, WLAN 5G is disabled. When WLAN 5G works, n79 is disabled.
2. When the n79 transmitting power exceeds a certain threshold (10 dBm), the module LAA_TX_EN outputs high level signal to disable WLAN 5G receiving LNA and protect WLAN receiving circuit.
3. When WLAN 5G transmitting power exceeds a certain threshold, WLAN 5G WLAN_TX_EN outputs high level signal to disable n79 receiving LNA and protect n79 receiving circuit.
4. For the pin definition about LAA_TX_EN and WLAN_TX_EN, please refer to the specific pin definition of relevant project.

2.2 WLAN 2.4G and NR n79

Coexistence scenario:

The second harmonic of WLAN 2.4G just falls in the band of n79, which may affect the reception performance of n79.



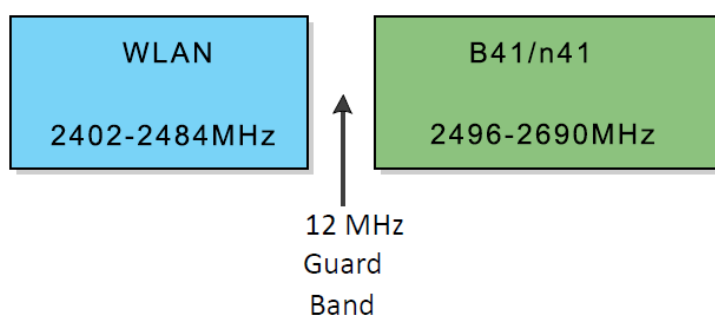
Coexistence mechanism:

WLAN 2.4G requires a filter with high out-of-band rejection in hardware design, and the suppression of 4800MHz–5000MHz needs to be greater than 35dB.

2.3 WLAN 2.4G and NR n41

Coexistence scenario:

The spectrum interval between n41 and WLAN 2.4G is only 12 MHz, and n41 will increase out-of-band spuriousness due to the increase of bandwidth when it works in 100MHz bandwidth, thus affecting the work of WLAN.



Coexistence mechanism:

1. In the hardware design of WLAN 2.4G, it is necessary to select a filter with high out-of-band suppression, and the band suppression of n41 needs to meet the

following requirements.

Characteristics			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Attenuation	2496 ... 2501	MHz	16.5 ^{4), 5)}	33 ⁴⁾	—	dB
	2500 ... 2510	MHz	34 ^{4), 5)}	52 ⁴⁾	—	dB
	2510 ... 2540	MHz	40 ⁴⁾	43 ⁴⁾	—	dB
	2540 ... 2570	MHz	32 ⁴⁾	36 ⁴⁾	—	dB
	2570 ... 2690	MHz	30 ⁴⁾	33 ⁴⁾	—	dB
	4800 ... 5805	MHz	35	42	—	dB
	7200 ... 7500	MHz	30	42	—	dB

⁴⁾ Averaged values of linear S-parameter over any 5 MHz.

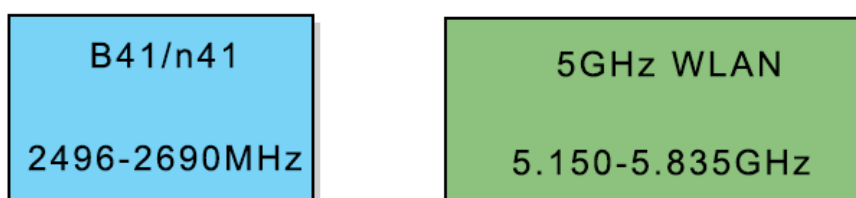
⁵⁾ +25°C to +85°C.

- n41 reserves a notch filter for WLAN on the hardware, which can suppress 25dB for the frequency of WLAN 2400MHz–2430MHz, protect the low channel of WLAN, and ensure a clean environment for WLAN.
- WLAN 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.

2.4 WLAN 5G and NR n41

Coexistence scenario:

The second harmonic of n41 will fall in the band of WLAN 5G, which may affect the receiving performance of WLAN 5G.



Coexistence mechanism:

The hardware of the module has been fully considered, and necessary filter is added on n41 path to suppress the second harmonic in the design to meet the requirements of

coexistence.