FCC certification of JODY-W164-A product variants

1. Background

This document is submitted as a cover letter to our KDB enquiry on the use and applicability of test reports obtained from JODY-W164-03A on JODY-W164-07A, furthermore to ask for instructions for additionally required tests.

u-blox intend to file applications for single-modular transmitter approval for our product types JODY-W164-03A and JODY-W164-07A. The products are currently being tested at an accredited test lab. The following table provides an overview of the FCC ID and respective product variants.

FCC ID	u-blox product ordering code
XPYJODYW164	JODY-W164-03A
XPYJODYW164-07A	JODY-W164-07A

The JODY-W164-A product family stands for host-based multi-radio modules with Wi-Fi (802.11a/b/g/n/ac) and Bluetooth 4.2.

KDB 484596 D01 provides guidance for referencing test data across separate equipment authorization applications. Since the KDB is in DRAFT status we hereby ask for confirmation that following the guidance of KDB 484595 D01 is sufficient or if additional requirements may apply?

2. Product description, technical differences

Supported radio technologies and operating modes

Both JODY-W164-A products offer two antenna pins, ANT0 and ANT1. The following radio technologies are available at the two antennas pins:

u-blox ordering code: Antenna pin:	JODY-W164-03A	JODY-W164-07A
ANT0	Bluetooth, 5 GHz Wi-Fi	Bluetooth
ANT1	2.4 GHz Wi-Fi, 5 GHz Wi-Fi	2.4 GHz Wi-Fi, 5 GHz Wi-Fi

JODY-W164-03A supports 1x1 SISO operation in the 2.4 GHz band and 2x2 MIMO operation in the 5 GHz band, whereas JODY-W164-07A supports 1x1 SISO operation in both, 2.4 GHz and 5 GHz bands.

Real simultaneous dual-band (RSDB) operation of 2.4 and 5 GHz Wi-Fi is supported by both product types on ANT1.

Both product types support Bluetooth on ANT0.
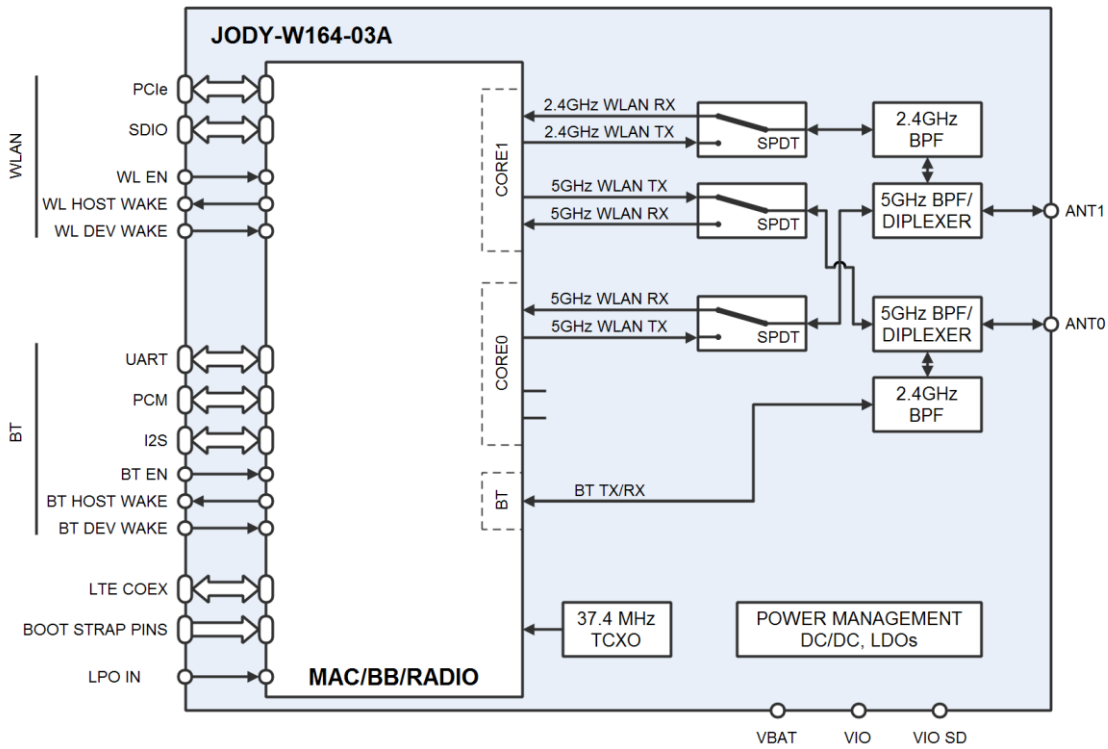
Block diagrams

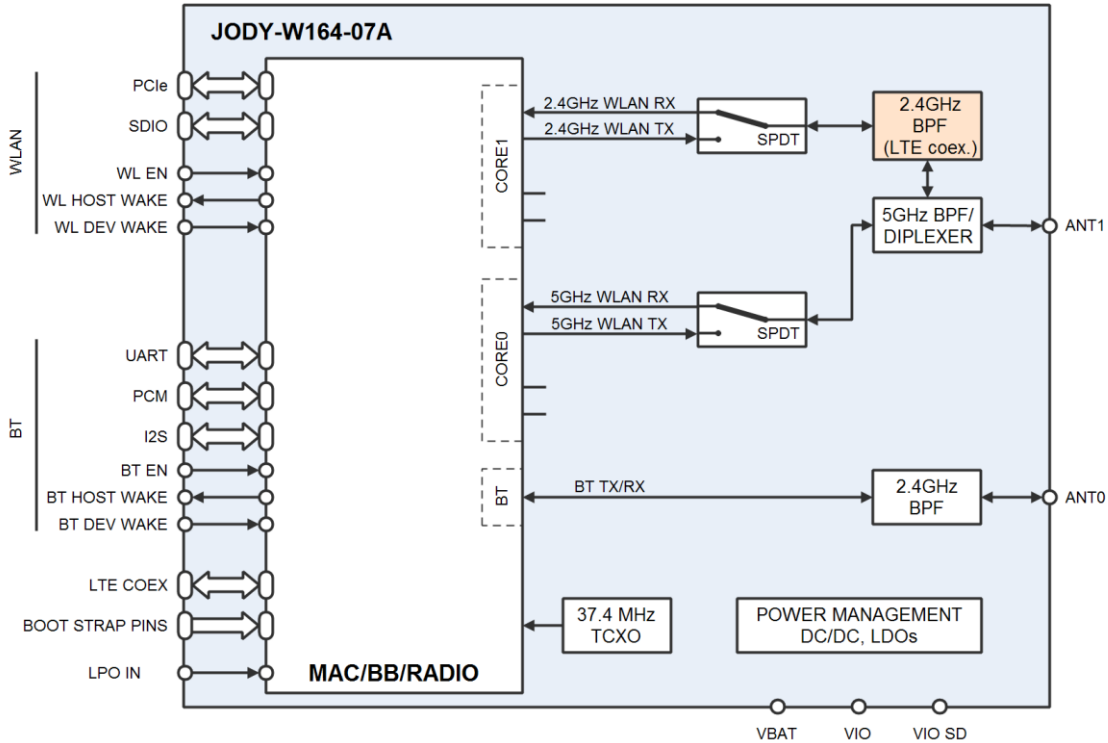**Figure 1:** Block diagram of JODY-W164-03A

Figure 2: Block diagram of JODY-W164-07A

In JODY-W164-07A, the band pass filter labelled "2.4 GHz BPF (LTE coex.)" is a BAW filter that enables co-existence with LTE. In JODY-W164-03A, the bandpass filters "2.4 GHz BPF" are ceramic bandpass filters.

RF-related design considerations

Both product types are assembly variants of the same Printed Circuit Board (PCB), the trace layouts of the ANT1 antenna pin of JODY-W164-03A and JODY-W164-07A are identical. JODY-W164-07A uses a different type of 2.4 GHz band-pass filter (selected to improve co-existence with LTE transmitters operating in neighboring bands of the 2.4 GHz ISM band) that is footprint-compatible with the 2.4 GHz band-pass filter on JODY-W164-03A.

The trace layouts on ANT0 differ between JODY-W164-03A and JODY-W164-07A. The diplexer component is not populated on the JODY-W164-07A design and a bypass trace connects directly to the module's antenna pin ANT0.

The radio transceiver chips used in the two products are from CYPRESS, part numbers CYP88359 and CYP89359. The difference between the two part numbers is that CYP89359 has an automotive-grade AEC-Q100 qualification. This results in extended quality assurance measures and service level agreements. The devices have identical technical specifications and are thus considered being identical for our modular transmitter certification application.

Both product types use exactly the same firmware and host software running on the external host.

3. Proposed re-use of test reports

Since the TX/RX RF paths for 5 GHz Wi-Fi on ANT1 are identical on both product types JODY-W164-03A and JODY-W164-07A, we ask for permission to re-use the respective test report(s) from JODY-W164-03A for JODY-W164-07A.

The TX/RX RF paths for 2.4 GHz Wi-Fi on ANT1 differ only in the populated band-pass filter. Therefore we propose to perform full tests on JODY-W164-03A and only spot-check measurements for JODY-W164-07A for worst-case conditions to provide sufficient evidence to apply the test results from JODY-W164-03A to JODY-W164-07A.

Likewise, for Bluetooth testing we propose to perform full tests on JODY-W164-03A and only spot-check measurements for JODY-W164-07A for worst-case conditions to provide sufficient evidence to apply the test results from JODY-W164-03A to JODY-W164-07A.

With this letter we **ask for permissions and instructions to re-use test reports on Wi-Fi 2.4 GHz, Wi-Fi 5 GHz, and Bluetooth** as outlined above and summarized in Section 4 below.

4. Planned test reports as basis for FCC certification

JODY-W164-03A

Scope of report	Standard compliance	Tested model	Test report reference	Comments
WLAN 2.4 GHz	FCC 15.247	JODY-W164-03A	FCCa	Full tests
WLAN 5 GHz	FCC 15.407	JODY-W164-03A	FCCb	Full tests
Bluetooth	FCC 15.247	JODY-W164-03A	FCCa	Full tests
DFS client	FCC 15.407	JODY-W164-03A	FCCb	Full tests
Simultaneous transmission	FCC 15.247, FCC 15.407	JODY-W164-03A	FCCc	WLAN 5 GHz, WLAN 2.4 GHz and Bluetooth simultaneous transmission

JODY-W164-07A

Scope of report	Standard compliance	Tested model	Test report reference	Comments
WLAN 2.4 GHz	FCC 15.247	JODY-W164-03A	FCCa	Re-use of test report
		JODY-W164-07A	FCCd	Spotchecks
WLAN 5 GHz	FCC 15.407	JODY-W164-03A	FCCb	Re-use of test report
Bluetooth	FCC 15.247	JODY-W164-03A	FCCa	Re-use of test report
		JODY-W164-07A	FCCd	Spotchecks
DFS client	FCC 15.407	JODY-W164-03A	FCCb	Re-use of test report. JODY-W164-07A has identical 5 GHz hardware and DFS software configuration as JODY-W164-03A.
Simultaneous transmission	FCC 15.247, FCC 15.407	JODY-W164-07A	FCCe	Full tests. WLAN 5 GHz, WLAN 2.4 GHz and Bluetooth simultaneous transmission