

General Description

The MAX2831 evaluation kit (EV kit) simplifies testing of the MAX2831 receive and transmit performance in 802.11g/b applications operating in the 2.4GHz to 2.5GHz ISM band. The EV kit provides 50Ω SMA connectors for all RF and baseband inputs and outputs. Differential-to-single-ended and single-ended-to-differential line drivers are provided to convert the differential I/Q baseband inputs and outputs to single ended.

Features

- On-Board Line Driver and Voltage Reference
- 50Ω SMA Connectors on All RF and Baseband Ports
- PC Control Software Available at www.maximintegrated.com

Quick Start

The MAX2831 EV kit is fully assembled and factory tested. Follow the instructions in the [Connections and Setup](#) section to test the devices.

Test Equipment Required

This section lists the recommended test equipment to verify the operation of the MAX2831. It is intended as a guide only and substitutions may be possible:

- MAX2831 EV kit
- INTF3000+ interface board
- DC supply capable of delivering +5V and 200mA of continuous current
- DC supply capable of delivering -5V and 200mA of continuous current
- DC supply capable of delivering +3.3V and 300mA of continuous current
- DC supply capable of delivering +2.85V and 200mA of continuous current
- One HP8648s or equivalent signal sources capable of generating 0dBm up to 3GHz
- 802.11b/g CW I/Q waveform generator
- HP8561E or equivalent RF spectrum analyzer with a minimum 100kHz to 3GHz frequency range
- TDS3012 or equivalent oscilloscope with 200MHz bandwidth
- PC laptop or tablet with Microsoft Windows XP®, Windows® 7, 8 OS and a USB port
- USB-A male to USB-B male cable

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Connections and Setup

This section provides step-by-step instructions for getting the EV kit up and running in all modes (see [Figure 1](#) for EV kit connections):

- 1) Connect the PC to the INTF3000 interface board using the USB-A male to USB-B male cable. On INTF3000, remove jumper JU1 and connect a DC supply set to 3.3V to the V_{PULL} connector. Connect the 25-pin connector of the INTF3000 (J4) directly to the 25-pin connector on the EV kit (J18).
- 2) With the power supply turned off, connect a +2.85V power supply to V_{REG} (pin 1), V_{CCAUX}, and a +3.3V power supply to V_{BAT}. Connect the power-supply ground to the header labeled GND1 or GND2.
- 3) With the power supply turned off, connect a +5V power supply to the +5V test point and a -5V power supply to the -5V test point. Connect the power-supply ground to the header labeled GND1 or GND2. Connect all the power-supply grounds together.
- 4) Make sure the jumpers are installed in their default positions as shown in [Figure 1](#).
- 5) Turn on the +3.3V power supply, followed by the +2.85V power supply, +5V power supply, and -5V power supply.
- 6) Install and run the MAX2831 control software, available for download [here](#).

Receive Mode

- 1) Set the RXTX jumper across pins 2-3 (RX) to enable the receiver and disable the transmitter. Set the ANTSEL jumper to its default position 2-3 (ANT1).
- 2) Set the signal generator to accurately deliver -100dBm at 2438MHz, at the SMA port (ANT1/RXRf) of MAX2831. Connect the output of signal generator to RXRF port of MAX2831.
- 3) On the Registers page of the EV kit software, set the register values to the recommended setting in the MAX2831 data sheet by clicking the "Defaults" and "Send All" buttons.
- 4) On the Entry page, confirm that the "Receive Mode" is set to "normal," "Baseband Filter Mode Control" is set to "RX," and the "RF frequency" is tuned to 2437MHz. Maximize the RX LNA and RX VGA Gain.
- 5) Connect the spectrum analyzer to either RXBBI or RXBBQ. Set the center frequency to 1MHz with a span

of 500kHz. Other recommended spectrum analyzer settings are: Res BW of 1kHz and Ref Level of 10dB.

- 6) Turn on the RF signal source. The supply current draw should be approximately 70mA. The output CW tone at 1MHz should be approximately -2dBm.

Transmit Mode

- 1) Set the RXTX jumper across pins 1-2 (TX) to enable the transmitter and disable the receiver. Keep the ANTSEL jumper at its default position 2-3 (ANT1).
- 2) Connect TXRF port to the spectrum analyzer. Set the center frequency of spectrum analyzer to 2437MHz and span to 10MHz. Other recommended spectrum analyzer settings are: Res BW of 3kHz, Attenuation of 30dB and Ref Level of 22dB.
- 3) Connect a 1MHz sinusoid to TXBBI and a 1MHz sinusoid with a 90° phase shift (or a cosine) to TXBBQ. Set the input amplitude of each channel to 100mV_{RMS}.
- 4) On the Registers page of the EV kit software, set the register values to the recommended register setting listed in the MAX2831 data sheet by clicking the "Defaults" and "Send All" buttons.
- 5) On the Entry page, make sure that the "Transmitter Mode" is set to "normal," "Baseband Filter Mode Control" is set to "TX," and the "RF Frequency" is tuned to 2437MHz. Set the TX gain to maximum using the "TX VGA Gain" sliding bar.
- 6) Enable the output of the baseband signal sources. The supply current draw should be approximately 88mA.
- 7) The TX output power at 2438MHz should be approximately 21dBm. The LO leakage at 2437MHz should be -16dBm and unwanted sideband at 2436MHz should be -17dBm.

Note: CW signals can be replaced by modulated 802.11g/b signals.

Layout Considerations

The EV kit can serve as a guide for board layout. Keep PCB trace lengths as short as possible to minimize parasitic inductance. Also, keep decoupling capacitors as close to the IC as possible with a direct connection to the ground plane.

Power-Supply Layout

To minimize coupling between different sections of the IC, use a star power-supply routing configuration with a large decoupling capacitor at a central V_{CC} node. The V_{CC} traces branch out from this node, each going to a separate V_{CC} node in the circuit. Place a bypass capacitor as close as possible to each supply pin. This arrangement provides local decoupling at each V_{CC} pin. Use at least one throughput per bypass capacitor for a low-inductance ground connection. Do not share the capacitor ground vias with any other branch.

Table 1. Jumper Functions

JUMPER	SETTING	FUNCTION
RXTX	Pins 2-3	Enable receive mode
	Pins 1-2	Enable transmit mode
ANTSEL	Pins 2-3	Default
TXBBBUF/RXBBBUF	Pins 1-2	Enables the buffers
	Pins 2-3	Disables the buffers
VREG	Pins 1-2	Short the jumper to provide voltage to the MAX2831 from the linear regulator (U10)
VCCVCO	Pins 2-3	Supply the V _{CCVCO} from VREG
	Pins 1-2	Supply the V _{CCVCO} from the linear regulator (U10)

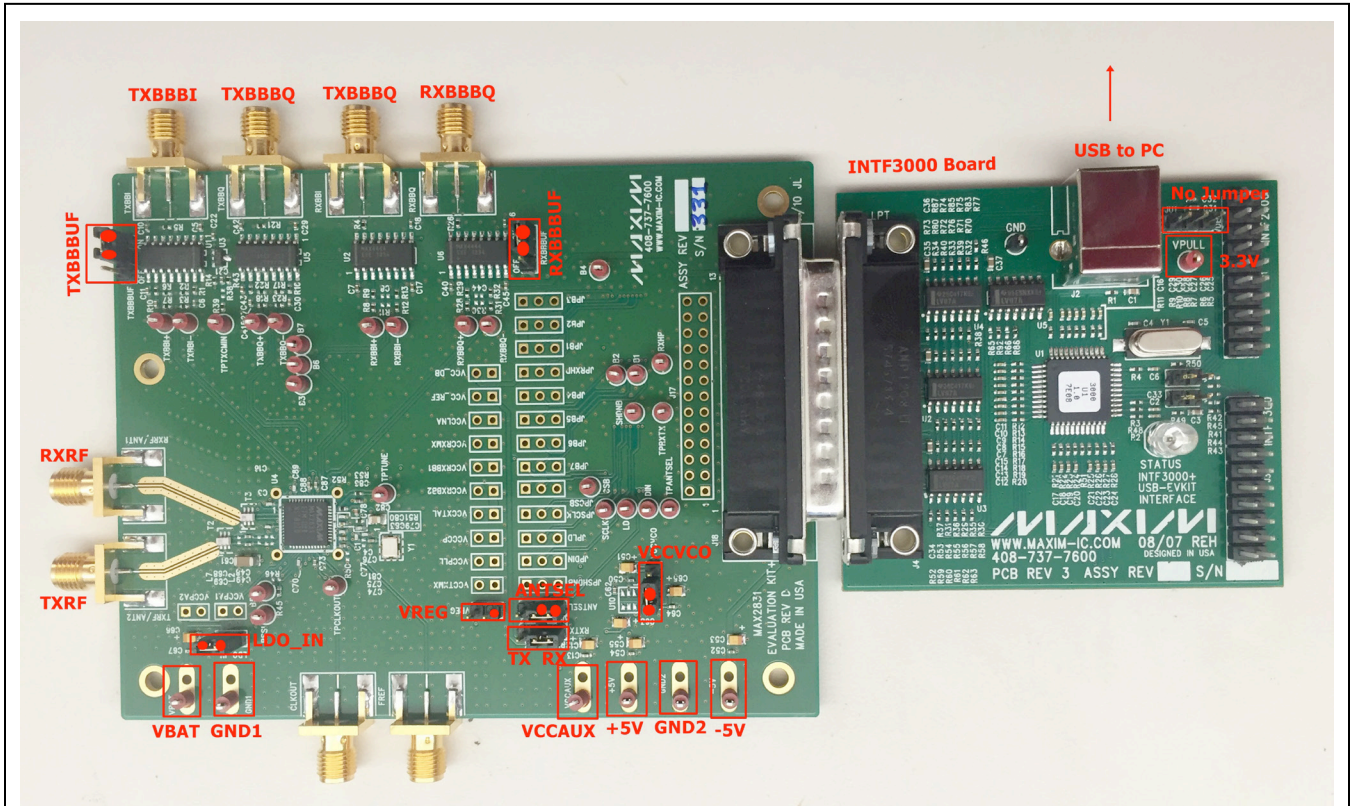


Figure 1. MAX2831 EV Kit Connections

Component Suppliers

SUPPLIER	WEBSITE
AVX Corp.	www.avx.com
Digi-Key Corp.	www.digikey.com
Johnson Components	www.johnsoncomponents.com
Murata Americas	www.murata.com
Texas Instruments Inc.	www.ti.com

Note: Indicate that you are using the MAX2831 when contacting these component suppliers.

Component List, PCB Layout, and Schematic

- [MAX2831 EV BOM](#)
- [MAX2831 EV PCB Layout](#)
- [MAX2831 EV Schematic](#)

Ordering Information

PART	TYPE
MAX2831EVKIT+	EV Kit

+Denotes a lead(Pb)-free and RoHS-compliant EV kit.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/07	Initial release	—
1	11/14	Updated <i>Quick Start</i> section	3
2	11/15	Added more detailed description for TX and RX sections and added Figure 1.	1–4
3	1/16	Updated connectivity information of INTF3000 board	1–3

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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DESIGNATION	QTY	DESCRIPTION
C1	1	33pF ±5% capacitor (0402) Murata GRM1555C1H330J
C3, C16, C70, C79, C81, C89	6	100pF ±5% capacitors (0402) Murata GRM1555C1H101J
C4	1	18pF ±5% capacitor (0402) Murata GRM1555C1H180J
C5, C7, C10, C11, C13, C17, C18, C21, C22, C29, C40, C42, C43, C45, C46, C50, C52, C54, C59, C60, C64, C67, C83, C86	24	100nF ±10% capacitors (0402) Murata GRM155R61A104K
C6, C9, C30, C41, C62, C73, C74, C75, C87, C88	10	0.01µF ±10% capacitors (0402) Murata GRM155R71C103K
C8, C44, C48, C49, C71, C72, C77	0	Not installed, capacitors
C12, C51, C53, C55, C63, C65, C66	7	10µF ±20% tantalum capacitors (R-case) AVX TAJR106M006
C61	1	10µF ±10% capacitor (1206) Murata GRM31CR60J106K
C68, C69	2	1.5pF ±0.25pF capacitors (0402) Murata GRM1555C1H1R5C
C76	1	1000pF ±10% capacitor (0402) Murata GRM155R71H102K
C78	1	2200pF ±10% capacitor (0402) Murata GRM155R71H222K
C80	1	68pF ±5% capacitor (0402) Murata GRM1555C1H680J
C82	1	10µF ±10% capacitor (0805) Murata GRM21BR60J106K
J17	0	Not installed
J18	1	DB25 right-angle male connector AMP 5747238-4
JPB1–JPB4, JPB6, JPB7, JPCSB, JPDIN, JPLD, JPRXHP, JPSCCLK, JPSHDNB	0	Not installed
L1, L2, L7	0	Not installed
LDO_IN, VREG	2	1 x 2 headers Sullins PEC36SAAN
R1, R2, R6, R10, R16, R17, R22, R27	8	75Ω ±1% resistors (0402)
R3, R7, R18, R23	4	3.3kΩ ±5% resistors (0402)
R4, R5, R21, R26	4	49.9Ω ±1% resistors (0402)
R8, R9, R12, R13, R28, R29, R31, R32	8	0Ω ±1% resistors (0402)
R11, R30, R38, R46, R50	0	Not installed, resistors
R14	1	270Ω ±5% resistor (0402)
R39, R45	2	100Ω ±1% resistors (0402)
R43	1	1kΩ ±1% resistor (0402)
R51	1	1.2kΩ ±5% resistor (0402)
R52	1	750Ω ±5% resistor (0402)
R53	1	10kΩ ±5% resistor (0402)
T1	0	Not installed
T2, T3	2	2.4GHz RF baluns Murata LDB212G4010C-001
U1, U5	2	Line drivers (16 SO) Maxim MAX4447ESE+
U2, U6	2	Line receivers (16 SO) Maxim MAX4444ESE+
U3	1	Low-dropout reference (3 SOT) Maxim MAX6061BEUR+
U4	1	Transceiver (48 TQFN) Maxim MAX2831ETM+
U8, U9	2	SN74LVTH244ADB TI SN74LVTH244ADBR
U10	0	Not installed (optional) Maxim MAX8882EUTJJ+
Y1	1	40MHz crystal Kyocera CX3225SB40000H0WZK21
+5V, -5V, B1–B7, CSB, DIN, GND1, GND2, LD, RSSI, RXBBI+, RXBBI-, RXBBQ+, RXBBQ-, RXHP, SCLK, SHDNB, TPANTSEL, TPCLKOUT, TPRXTX, TPTUNE, TPTXCMIN, TXBBI+ TXBBI-, TXBBQ+, TXBBQ-, VBAT, VCCAUX	33	Test points Keystone 5000
CLKOUT, FREF, RXBBI, RXBBQ, RXRF, TXBBI, TXBBQ, TXRF	8	SMA edge-mount connectors, round Johnson 142-0701-801
VCCLNA, VCCPA1, VCCPA2, VCCPLL, VCCRBB1, VCCRBB2, VCCRXXM, VCCTXXM, VCCXTAL, VCC_DB, VCC_REF, VREG	0	Not installed
—	6	Shunts (ANTSEL, LDO_IN, RXBBBUF, RXTX, TXBBBUF, VCCVCO) Sullins SSC02SYAN
—		PCB: MAX2830/1/2 EVALUATION KIT

