



# MAX2320/21/22/24/26/27 Evaluation Kits

## General Description

The MAX2320/MAX2321/MAX2322/MAX2324/MAX2326/MAX2327 evaluation kits (EV kits) simplify evaluation of these high-linearity, silicon germanium (SiGe), dual-band LNAs/mixers. They enable testing of the devices' RF performance and require no additional support circuitry. The signal inputs and outputs use SMA connectors to simplify the connection of RF test equipment.

The MAX2320/21/22/24/26/27 EV kits are assembled with an associated IC and incorporate input and output matching components optimized for the 869MHz to 894MHz cellular frequency band, 1930MHz to 1990MHz PCS frequency band, 210MHz digital mixer output frequency, and 110MHz FM mixer output frequency. All matching components may be changed to work at other frequencies within the bands specified in the MAX2320/21/22/24/26/27 data sheet.

## Ordering Information

| PART         | TEMP. RANGE    | IC PACKAGE   |
|--------------|----------------|--------------|
| MAX2320EVKIT | -40°C to +85°C | 20 TSSOP-EP* |
| MAX2321EVKIT | -40°C to +85°C | 20 TSSOP-EP  |
| MAX2322EVKIT | -40°C to +85°C | 20 TSSOP-EP  |
| MAX2324EVKIT | -40°C to +85°C | 20 TSSOP-EP  |
| MAX2326EVKIT | -40°C to +85°C | 20 TSSOP-EP  |
| MAX2327EVKIT | -40°C to +85°C | 20 TSSOP-EP  |

\*EP = Exposed paddle

## Component Suppliers

| SUPPLIER           | PHONE        | FAX          | URL               |
|--------------------|--------------|--------------|-------------------|
| AVX                | 803-946-0690 | 803-626-3123 | www.avxcorp.com   |
| Coilcraft          | 847-639-6400 | 803-639-1469 | www.coilcraft.com |
| EFJohnson          | 402-474-4800 | 402-474-4858 | www.efjohnson.com |
| Kamaya             | 219-489-1533 | 219-489-2261 | www.kamaya.com    |
| Murata Electronics | 800-831-9172 | 814-238-0490 | www.murata.com    |
| Sprague            | 603-224-1961 | 603-224-1430 | www.vishay.com    |
| Toko               | 408-432-8281 | 408-943-9790 | www.toko.com      |

## Features

- ◆ 50Ω SMA Ports for Easy Testing
- ◆ +2.7V to +3.6V Single-Supply Operation
- ◆ All Critical Matching Components Included
- ◆ Fully Assembled and Tested

## MAX2320/21/26/27 EV Kits Component List

| DESIGNATION                    | QTY | DESCRIPTION                                                                                                                  |
|--------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------|
| C1, C32                        | 2   | 1.0pF ±0.1pF ceramic caps (0603)<br>Murata GRM39COG010B50V                                                                   |
| C2                             | 1   | 2.7pF ±0.1pF ceramic cap (0603)<br>Murata GRM39COG2R7B50V                                                                    |
| C6, C11, C15,<br>C18, C20, C28 | 6   | 100pF ±5% ceramic caps (0603)<br>Murata GRM39COG101J50V                                                                      |
| C4, C5,<br>C8, C34             | 4   | 6800pF ±5% ceramic caps (0603)<br>Murata GRM39X7R682J50V                                                                     |
| C7, C17                        | 2   | 22pF ±5% ceramic caps (0603)<br>Murata GRM39COG220J50V                                                                       |
| C9                             | 1   | 0.033μF ±10% ceramic cap (0603)<br>Murata GRM39X7R333K50V                                                                    |
| C10                            | 1   | 4.7pF ±0.1pF ceramic cap (0402)<br>Murata GRM36COG4R7B50V                                                                    |
| C12                            | 1   | 10μF ±20%, 16V tantalum capacitor<br>AVX TAJB106M016 or<br>Sprague 293D106X0010B                                             |
| C13, C14, C23                  | 3   | 3.3pF ±0.1pF ceramic caps (0603)<br>Murata GRM39COG3R3B50V or<br>3.3pF ±0.25pF ceramic caps (0603)<br>Murata GRM39COG3R3C50V |
| C16, C19, C21,<br>C22          | 4   | 0.01μF ±5% ceramic caps (0603)<br>Murata GRM39X7R103J50V                                                                     |
| C24–C27, C29                   | 5   | 1000pF ±5% ceramic caps (0603)<br>Murata GRM39X7R102J50V                                                                     |
| C31                            | 1   | 1.5pF ±0.1pF ceramic cap (0603)<br>Murata GRM39COG1R5B50V                                                                    |
| C35                            | 1   | 18pF ±5% ceramic cap (0603)<br>Murata GRM39COG1180J50V                                                                       |

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# MAX2320/21/22/24/26/27 Evaluation Kits

## MAX2320/21/26/27 EV Kits Component List (continued)

| DESIGNATION |                   | QTY | DESCRIPTION                                                       |
|-------------|-------------------|-----|-------------------------------------------------------------------|
| L1          |                   | 1   | 1.8nH $\pm 10\%$ inductor (0603)<br>Coilcraft 0603CS-1N8XKBC      |
| L2          |                   | 1   | 6.8nH $\pm 5\%$ inductor (0603)<br>Murata LQG11A6N8J00            |
| L3          |                   | 1   | 330nH $\pm 5\%$ inductor (1008)<br>Coilcraft 1008CS-331XJBC       |
| L4, L5      |                   | 2   | 110nH $\pm 5\%$ inductors (0603)<br>Coilcraft 0603CS-R11XJBC      |
| L6          |                   | 1   | 3.85nH $\pm 10\%$ inductor<br>Coilcraft 0906-4-10                 |
| L7          |                   | 1   | 4.7nH $\pm 0.3\text{nH}$ inductor (0603)<br>Toko LL1608-FH4N7S    |
| L8          |                   | 1   | 5.6nH $\pm 0.5\text{nH}$ inductor (0603)<br>Murata LQW1608A5N6D00 |
| L9          | MAX2320/<br>26/27 | —   | Not installed                                                     |
|             | MAX2321           | 1   | 8.2nH $\pm 5\%$ inductor (0603)<br>Murata LQG11A8N2J00            |
| L10         |                   | 1   | 1.65nH air core<br>Coilcraft 0906-2                               |
| R1          | MAX2320/<br>26/27 | 1   | 20k $\Omega$ $\pm 5\%$ resistor (0402)<br>Kamaya RMC16S-203JT     |
|             | MAX2327           | —   | Not installed                                                     |
| R2          |                   | 1   | 20k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-203JT      |

| DESIGNATION                                                                                                   |         | QTY | DESCRIPTION                                                   |
|---------------------------------------------------------------------------------------------------------------|---------|-----|---------------------------------------------------------------|
| R3, R4                                                                                                        |         | 2   | 51 $\Omega$ $\pm 5\%$ resistors (0603)<br>Kamaya RMC16-51RJT  |
| R5                                                                                                            |         | 1   | 2k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-202JT   |
| R6, R7, R8, R10                                                                                               |         | 4   | 1k $\Omega$ $\pm 5\%$ resistors (0603)<br>Kamaya RMC16-102JT  |
| R9                                                                                                            |         | 1   | 8.2k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-822JT |
| R11                                                                                                           |         | 1   | 30 $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-30RJT   |
| T1                                                                                                            |         | 1   | Balun transformer (B5F type)<br>Toko 458DB-1011               |
| LNAINH, LNAOUTH,<br>LNAINL, LNAOUTL,<br>LOLIN, LOHIN,<br>LOOUTH, LOOUTL,<br>FMOUT, CDMAOUT,<br>MIXINL, MIXINH |         | 12  | SMA connectors (PC edge mount)<br>EFJohnson 142-0701-801      |
| GND, VCC                                                                                                      |         | 2   | Test points                                                   |
| JU1–JU4, JU6                                                                                                  |         | 5   | 3-pin headers                                                 |
| JU5, JU8                                                                                                      |         | 2   | 2-pin headers                                                 |
| None                                                                                                          |         | 7   | Shunts (JU1–JU6, JU8)                                         |
| U1                                                                                                            | MAX2320 | 1   | MAX2320EUP, 20-pin TSSOP-EP                                   |
|                                                                                                               | MAX2321 | 1   | MAX2321EUP, 20-pin TSSOP-EP                                   |
|                                                                                                               | MAX2326 | 1   | MAX2326EUP, 20-pin TSSOP-EP                                   |
|                                                                                                               | MAX2327 | 1   | MAX2327EUP, 20-pin TSSOP-EP                                   |

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## MAX2322 EV Kit Component List

| DESIGNATION                                       | QTY | DESCRIPTION                                                                                                                            |
|---------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------|
| C1, C32                                           | 2   | 1.0pF $\pm$ 0.1pF ceramic caps (0603)<br>Murata GRM39COG010B50V                                                                        |
| C2, C3, C5, C6,<br>C9, C10, C18,<br>C22, C23, C30 | —   | Not installed                                                                                                                          |
| C7, C17                                           | 2   | 22pF $\pm$ 5% ceramic capacitors (0603)<br>Murata GRM39COG220J50V                                                                      |
| C4, C8                                            | 20  | 6800pF $\pm$ 5% ceramic caps (0603)<br>Murata GRM39X7R082J50V                                                                          |
| C9                                                | 1   | 0 $\Omega$ resistor<br>Kamaya RMC16-0R0JT                                                                                              |
| C11, C15, C20                                     | 3   | 100pF $\pm$ 5% ceramic caps (0603)<br>Murata GRM39COG101J50V                                                                           |
| C12                                               | 1   | 10 $\mu$ F $\pm$ 20%, 16V, tantalum capacitor<br>AVX TAJB106M016 or<br>Sprague 293D106X0010B                                           |
| C13, C14                                          | 2   | 3.3pF $\pm$ 0.1pF ceramic caps (0603)<br>Murata GRM39COG3R3B50V or<br>3.3pF $\pm$ 0.25pF ceramic caps (0603)<br>Murata GRM39COG3R3C50V |
| C16, C19, C21                                     | 3   | 0.01 $\mu$ F $\pm$ 5% ceramic caps (0603)<br>Murata GRM39X7R103J50V                                                                    |
| C24–C29                                           | 6   | 1000pF $\pm$ 5% ceramic caps (0603)<br>Murata GRM39X7R102J50V                                                                          |
| C31                                               | 1   | 1.5pF $\pm$ 0.1pF ceramic cap (0603)<br>Murata GRM39COG1R5B50V                                                                         |
| C33                                               | 1   | 33pF $\pm$ 5% ceramic capacitor (0402)<br>Murata GRM36COG330J50V                                                                       |
| L1                                                | 1   | 1.8nH $\pm$ 10% inductor (0603)<br>Coilcraft 0603CS-1N8XKBC                                                                            |
| L2, L3, L6,<br>L7, L9                             | —   | Not installed                                                                                                                          |
| L4, L5                                            | 2   | 110nH $\pm$ 5% inductors (0603)<br>Coilcraft 0603CS-R11XJBC                                                                            |

| DESIGNATION                                                    | QTY | DESCRIPTION                                                  |
|----------------------------------------------------------------|-----|--------------------------------------------------------------|
| L8                                                             | 1   | 5.6nH $\pm$ 0.5nH inductor (0603)<br>Murata LQW1608A5N6D00   |
| L10                                                            | 1   | 1.65nH air core<br>Coilcraft 0906-2                          |
| R1                                                             | 1   | 20k $\Omega$ $\pm$ 5% resistor (0402)<br>Kamaya RMC16S-203JT |
| R2                                                             | 1   | 20k $\Omega$ $\pm$ 5% resistor (0603)<br>Kamaya RMC16-203JT  |
| R3                                                             | 1   | 51 $\Omega$ $\pm$ 5% resistor (0603)<br>Kamaya RMC16-51RJ    |
| R4                                                             | —   | Not installed                                                |
| R5                                                             | 1   | 2k $\Omega$ $\pm$ 5% resistor (0603)<br>Kamaya RMC16-202JT   |
| R6, R7, R8,<br>R10                                             | 4   | 1k $\Omega$ $\pm$ 5% resistors (0603)<br>Kamaya RMC16-102JT  |
| R9                                                             | 1   | 8.2k $\Omega$ $\pm$ 5% resistor (0603)<br>Kamaya RMC16-822JT |
| R11                                                            | 1   | 30 $\Omega$ $\pm$ 5% resistor (0603)<br>Kamaya RMC16-30RJ    |
| T1                                                             | 1   | Balun transformer (B5F type)<br>Toko 458DB-1011              |
| LNAINH,<br>LNAOUTH,<br>LOHIN,<br>LOOUTH,<br>CDMAOUT,<br>MIXINH | 6   | SMA connectors (PC edge mount)<br>EFJohnson 142-0701-801     |
| GND, VCC                                                       | 2   | Test points                                                  |
| JU1–JU4, JU6                                                   | 5   | 3-pin headers                                                |
| JU5, JU8                                                       | 2   | 2-pin headers                                                |
| None                                                           | 7   | Shunts (JU1–JU6, JU8)                                        |
| U1                                                             | 1   | MAX2322EUP, 20-pin TSSOP-EP                                  |

Evaluate: MAX2320/21/22/24/26/27

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## MAX2324 EV Kit Component List

| DESIGNATION                                  | QTY | DESCRIPTION                                                                                                                              |
|----------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------|
| C1, C4, C7, C8, C17, C20, C21, C31, C32, C33 | —   | Not installed                                                                                                                            |
| C2                                           | 1   | 2.7pF $\pm 0.1$ pF ceramic cap (0603)<br>Murata GRM39COG2R7B50V                                                                          |
| C6, C11, C15, C18, C28                       | 5   | 100pF $\pm 5\%$ ceramic caps (0603)<br>Murata GRM39COG101J50V                                                                            |
| C5, C30                                      | 2   | 6800pF $\pm 5\%$ ceramic caps (0603)<br>Murata GMR39X7R682J50V                                                                           |
| C9                                           | 1   | 0.033 $\mu$ F $\pm 10\%$ ceramic cap (0603)<br>Murata GRM39X7R333K50V                                                                    |
| C10                                          | 1   | 4.7pF $\pm 0.1$ pF ceramic cap (0402)<br>Murata GRM36COG4R7B50V                                                                          |
| C12                                          | 1   | 10 $\mu$ F $\pm 20\%$ , 16V, tantalum capacitor<br>AVX TAJB106M016 or<br>Sprague 293D106X0010B                                           |
| C13, C14, C23                                | 3   | 3.3pF $\pm 0.1$ pF ceramic caps (0603)<br>Murata GRM39COG3R3B50V or<br>3.3pF $\pm 0.25$ pF ceramic caps (0603)<br>Murata GRM39COG3R3C50V |
| C16, C19, C22                                | 3   | 0.01 $\mu$ F $\pm 5\%$ ceramic capacitors (0603)<br>Murata GRM39X7R103J50V                                                               |
| C24–C27, C29                                 | 5   | 1000pF $\pm 5\%$ ceramic capacitors (0603)<br>Murata GRM39X7R102J50V                                                                     |
| C35                                          | 1   | 18pF $\pm 5\%$ ceramic capacitor (0603)<br>Murata GRM39COG180J50V                                                                        |
| L1, L7, L8, L9                               | —   | Not installed                                                                                                                            |
| L2                                           | 1   | 6.8nH $\pm 5\%$ inductor (0603)<br>Murata LQG11A6N8J00                                                                                   |
| L3                                           | 1   | 330nH $\pm 5\%$ inductor (1008)<br>Coilcraft 1008CS-331XJBC                                                                              |
| L4, L5                                       | 2   | 110nH $\pm 5\%$ inductors<br>Coilcraft 0603CS-R11XJBC                                                                                    |
| L6                                           | 1   | 3.85nH $\pm 10\%$ inductor<br>Coilcraft 0906-4-10                                                                                        |

| DESIGNATION                                            | QTY | DESCRIPTION                                                    |
|--------------------------------------------------------|-----|----------------------------------------------------------------|
| L10                                                    | 1   | 4.7nH $\pm 0.3$ nH inductor (0603)<br>Toko LL1608-FH4N7S       |
| R1                                                     | 1   | 20k $\Omega$ $\pm 5\%$ resistor (0402)<br>Kamaya RMCS16S-203JT |
| R2                                                     | 1   | 20k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-203JT   |
| R3                                                     | —   | Not installed                                                  |
| R4                                                     | 1   | 51 $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-51RJT    |
| R5                                                     | 1   | 2k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-202JT    |
| R6, R7, R8, R10                                        | 4   | 1k $\Omega$ $\pm 5\%$ resistors (0603)<br>Kamaya RMC16-102JT   |
| R9                                                     | 1   | 8.2k $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-8252JT |
| R11                                                    | 1   | 30 $\Omega$ $\pm 5\%$ resistor (0603)<br>Kamaya RMC16-30RJT    |
| T1                                                     | 1   | Balun transformer (B5F type)<br>Toko 458DB-1011                |
| LNAINL, LNAOUTL, LOLIN, LOOUTL, FMOUT, CDMAOUT, MIXINL | 7   | SMA connectors (PC edge mount)<br>EFJohnson 142-0701-801       |
| GND, VCC                                               | 2   | Test points                                                    |
| JU1–JU4, JU6                                           | 5   | 3-pin headers                                                  |
| JU5, JU8                                               | 2   | 2-pin headers                                                  |
| None                                                   | 7   | Shunts (JU1–JU6, JU8)                                          |
| U1                                                     | 1   | MAX2324EUP, 20-pin TSSOP-EP                                    |

# MAX2320/21/22/24/26/27 Evaluation Kits

## Quick Start

The MAX2320/21/22/24/26/27 EV kits are fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation. Figures 1, 2, and 3 show the schematics. Figures 4 through 9 are component placement guides and PC board layouts.

## Test Equipment Required

The adjacent table lists the required test equipment to verify MAX2320/MAX2321/MAX2322/MAX2324/MAX2326/MAX2327 operation. It is intended as a guide only, and some substitutions are possible.

## Connections and Setup

This section provides a step-by-step guide to operating the EV kits and testing the devices' functions. Do not turn on DC power or RF signal generators until all connections are made.

## Testing the LNA

1) Connect a DC supply set to +2.7V (through an ammeter if desired) to the VCC and GND terminals on the EV kit. If available, set the current limit to 40mA.

2) Install the shunts across jumpers JU5 and JU8. Install the shunt across JU6 to the FMMXR position and across JU4 to the OFF position. See Tables 1–5 for positions of the shunts across JU1, JU2, and JU3 for different modes.

| EQUIPMENT            | DESCRIPTION                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------|
| RF Signal Generators | Capable of delivering at least 0dBm of output power up to 2.5GHz (HP 8648C or equivalent)                           |
| RF Spectrum Analyzer | Capable of covering the operating frequency range of the devices as well as a few harmonics (HP 8561E, for example) |
| Power Supply         | Capable of up to 100mA at +2.7V to +3.6V                                                                            |
| Ammeter              | For measuring the supply current (optional)                                                                         |
| Network Analyzer     | To measure small-signal return loss and gain (optional, HP 8753D, for example)                                      |

**Table 1. MAX2320/MAX2321/MAX2326 Mode Selection**

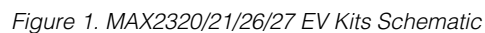
| JU2 SHUNT POSITION | JU1 SHUNT POSITION | JU3 SHUNT POSITION | MODE                                     |
|--------------------|--------------------|--------------------|------------------------------------------|
| CELL               | HLIN               | HGAIN              | Cellular band, high gain, high linearity |
| CELL               | HLIN               | LGAIN              | Cellular band, low gain, high linearity  |
| CELL               | LLIN               | HGAIN              | Cellular band, high gain, low linearity  |
| CELL               | LLIN               | LGAIN              | Cellular band FM                         |
| PCS                | HLIN               | HGAIN              | PCS band, high gain, high linearity      |
| PCS                | HLIN               | LGAIN              | PCS band, low gain, high linearity       |
| PCS                | LLIN               | HGAIN              | PCS band, high gain, low linearity       |
| PCS                | LLIN               | LGAIN              | Shutdown                                 |

**Table 2. MAX2322 Mode Selection**

| JU2 SHUNT POSITION* | JU1 SHUNT POSITION | JU3 SHUNT POSITION | MODE                                |
|---------------------|--------------------|--------------------|-------------------------------------|
| PCS                 | Don't care         | Don't care         | Shutdown                            |
| CELL                | HLIN               | HGAIN              | PCS band, high gain, high linearity |
| CELL                | HLIN               | LGAIN              | PCS band, low gain, high linearity  |
| CELL                | LLIN               | HGAIN              | PCS band, high gain, low linearity  |
| CELL                | LLIN               | LGAIN              | Not used                            |

\*JU2 is connected to the MAX2322 SHDN pin.

## MAX2320/21/22/24/26/27 Evaluation Kits



# MAX2320/21/22/24/26/27 Evaluation Kits

Evaluate: MAX2320/21/22/24/26/27

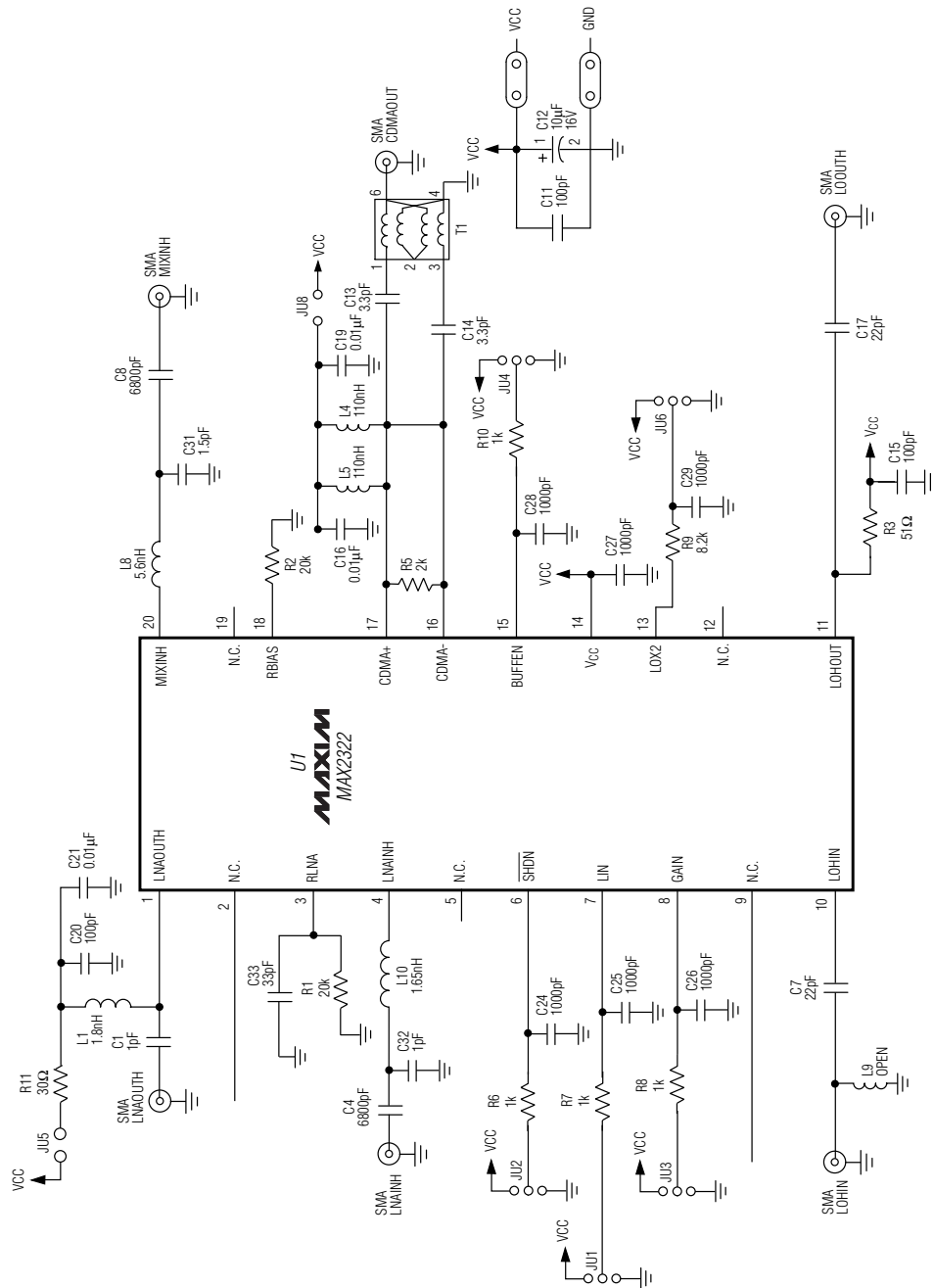


Figure 2. MAX2322 EV Kit Schematic

# MAX2320/21/22/24/26/27 Evaluation Kits

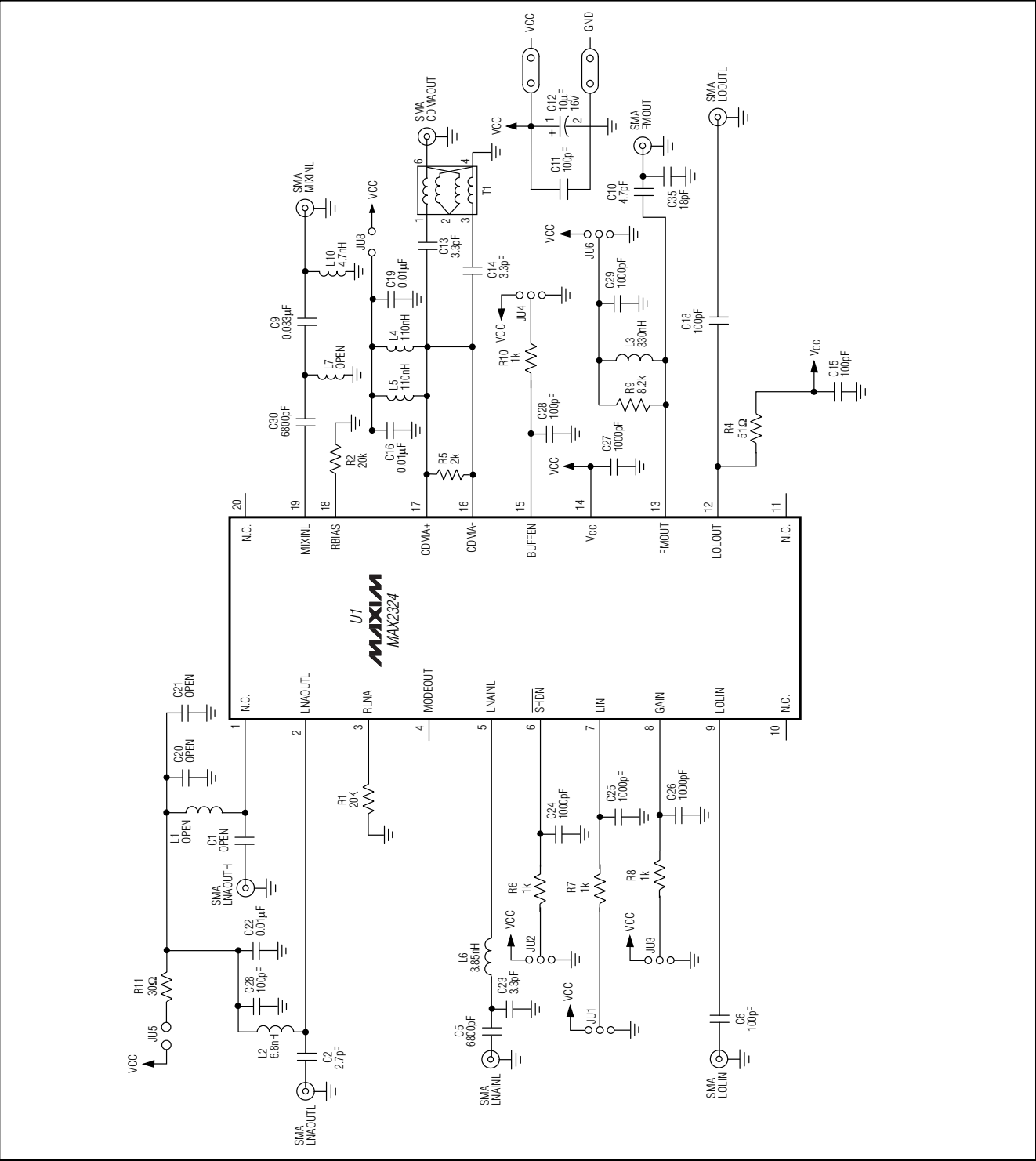


Figure 3. MAX2324 EV Kit Schematic

# MAX2320/21/22/24/26/27 Evaluation Kits

Evaluate: MAX2320/21/22/24/26/27

- 3) Connect one RF signal generator to the LNAINL (LNAINH) SMA connector for cellular (PCS) band testing. Do not turn on the generator's output. Set the generator for an output frequency of 881MHz (1960MHz) for cellular (PCS) band operation. Set the power level to -25dBm.
- 4) Connect the spectrum analyzer to the LNAOUTL (LNAOUTH) SMA connector for cellular (PCS) band. Set the center frequency to 881MHz (1960MHz) for cellular (PCS) band, and span to 5MHz.
- 5) Turn on the RF signal generator. The peak that appears on the spectrum analyzer should have a magnitude of about -11dBm in high-gain and FM modes. In low-gain modes, the magnitude should be about -27dBm. Be sure to account for cable losses (between 0.5dB and 2dB) and circuit board losses (approximately 0.5dB) when computing gain and noise figure.
- 6) (Optional) Another method for determining gain is by using a network analyzer. This has the advantage of displaying gain over a swept frequency band, in addition to displaying input and output return loss. Refer to the network analyzer manufacturer's user manual for setup details.

## Testing the Mixer

- 1) Connect a DC supply set to +2.7V (through an ammeter if desired) to the VCC and GND terminals on the EV kit. If available, set the current limit to 40mA.
- 2) Install the shunts across jumpers JU5 and JU8. Install the shunt across JU6 to the FMMXR position (except MAX2322; see Table 5) and across JU4 to OFF. See Tables 1–4 for positions of the shunts across JU1, JU2, and JU3 for different modes.
- 3) Connect an RF signal generator to the MIXINL (MIXINH) SMA connector for cellular (PCS) band testing. Do not turn on the generator's output. Set the generator for an output frequency of 881MHz (1960MHz) for cellular (PCS). Set the power level to -25dBm.
- 4) See Table 5, and connect the second RF signal generator to the appropriate LO connector and set the frequency accordingly. Set the power level to -6dBm.
- 5) In FM mode, connect the spectrum analyzer connector to the FMOUT SMA, set the center frequency to 110MHz, and span to 5MHz. For all other modes, connect the spectrum analyzer connector to the CDMAOUT SMA and set the center frequency to 210MHz and span to 5MHz.

**Table 3. MAX2324 Mode Selection**

| JU2 SHUNT POSITION* | JU1 SHUNT POSITION | JU3 SHUNT POSITION | MODE                                     |
|---------------------|--------------------|--------------------|------------------------------------------|
| PCS                 | Don't care         | Don't care         | Shutdown                                 |
| CELL                | HLIN               | HGAIN              | Cellular band, high gain, high linearity |
| CELL                | HLIN               | LGAIN              | Cellular band, low gain, high linearity  |
| CELL                | LLIN               | HGAIN              | Cellular band, high gain, low linearity  |
| CELL                | LLIN               | LGAIN              | FM                                       |

\*JU2 is connected to the MAX2324  $\overline{\text{SHDN}}$  pin.

**Table 4. MAX2327 Mode Selection**

| JU2 SHUNT POSITION | JU1 SHUNT POSITION* | JU3 SHUNT POSITION | MODE                                |
|--------------------|---------------------|--------------------|-------------------------------------|
| Don't care         | LLIN                | Don't care         | Shutdown                            |
| CELL               | HLIN                | HGAIN              | Cellular band, digital mixer output |
| CELL               | HLIN                | LGAIN              | Cellular band, FM                   |
| PCS                | HLIN                | HGAIN              | PCS band, digital mixer output      |
| PCS                | HLIN                | LGAIN              | Not used                            |

\*JU1 is connected to the MAX2327  $\overline{\text{SHDN}}$  pin.

# MAX2320/21/22/24/26/27 Evaluation Kits

**Table 5. LO Connector and LO Input Frequency Selection**

| DEVICE AND BAND OF OPERATION             | LO CONNECTOR | LO INPUT FREQUENCY (MHz) |
|------------------------------------------|--------------|--------------------------|
| MAX2320/MAX2327 Cellular                 | LOINL        | 1091                     |
| MAX2320/MAX2327 FM                       | LOINL        | 991                      |
| MAX2320/MAX2327 PCS                      | LOINH        | 1750                     |
| MAX2321 Cellular                         | LOINH        | 1091                     |
| MAX2321 FM                               | LOINL        | 991                      |
| MAX2321 PCS                              | LOINH        | 1085                     |
| MAX2322 PCS, JU6 shunt at LOX2N position | LOINH        | 1750                     |
| MAX2322 PCS, JU6 shunt at FMMXR position | LOINH        | 1085                     |
| MAX2324 Cellular                         | LOINL        | 1091                     |
| MAX2324 FM                               | LOINL        | 991                      |
| MAX2326 Cellular                         | LOINH        | 2182                     |
| MAX2326 FM                               | LOINL        | 991                      |
| MAX2326 PCS                              | LOINH        | 2170                     |

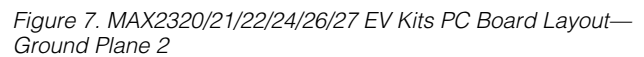
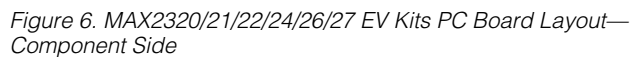
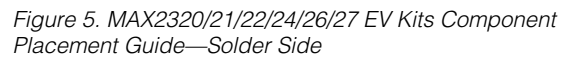
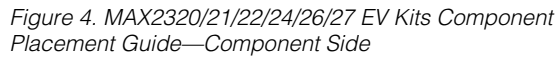
- 6) Turn on both RF signal generators. In FM mode, the spectrum analyzer should read about -15dBm at 110MHz. In all other modes, the peak should be about -13dBm at 210MHz. Be sure to account for cable losses (between 0.5dB and 2dB) and circuit board losses (approximately 0.5dB) when computing gain and noise figure.

## Layout

The EV kit PC board can serve as a guide for layout using the MAX2320/21/22/24/26/27.

Keep traces carrying RF signals as short as possible to minimize radiation and insertion loss due to the PC board. Keep the differential mixer output traces together and of equal length to ensure signal amplitude balance. Solder the entire bottom side slug evenly to the board ground plane for best RF performance. Run the input trace to the PCS LNA on the top layer of the PC board avoiding via-induced coupling. Minimize the parallel length of the cellular LNA input trace with the PCS LNA input trace.

**Evaluate: MAX2320/21/22/24/26/27**



# MAX2320/21/22/24/26/27 Evaluation Kits

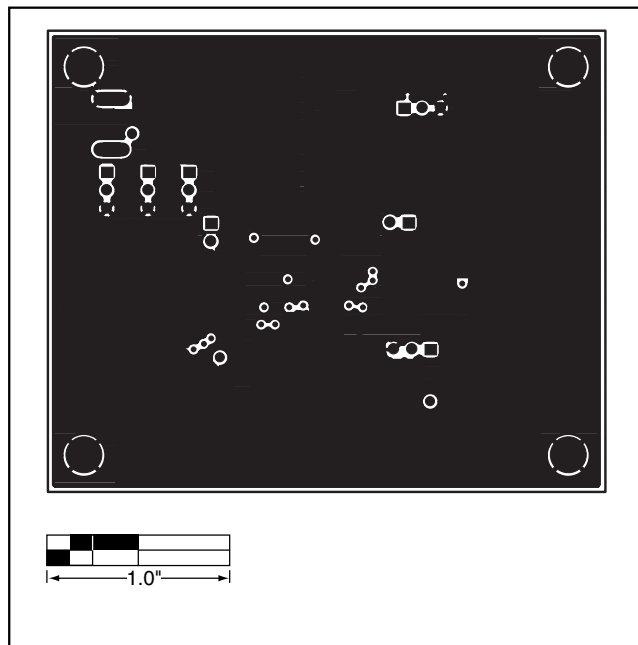


Figure 8. MAX2320/21/22/24/26/27 EV Kits PC Board Layout—Ground Plane 3

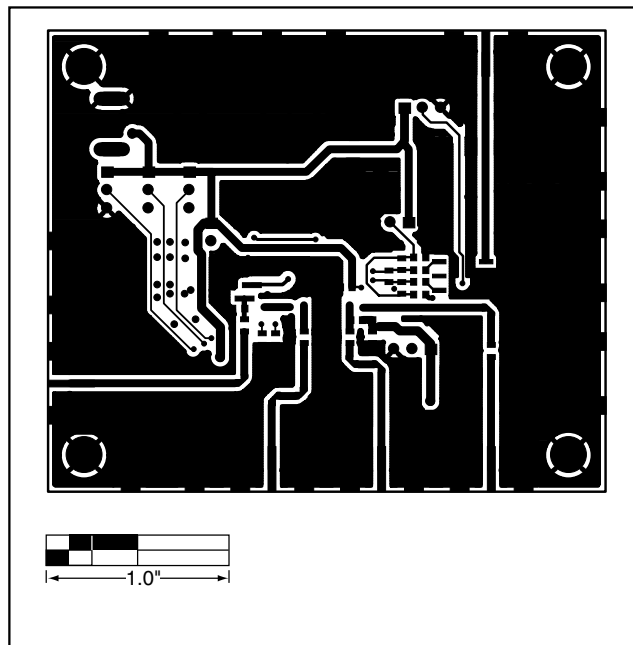


Figure 9. MAX2320/21/22/24/26/27 EV Kits PC Board Layout—Solder Side

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