

## 2-Layer EN55022 Class A Radiated Emissions Compliant Evaluation Board for the ADM2582E/ADM2587E 2.5 kV rms Signal and Power Isolated RS-485 Transceivers with $\pm 15$ kV ESD Protection

### FEATURES

2.5 kV rms power and signal isolated RS-485/RS-422 transceiver  
PCB layout optimized for EN55022 radiated emissions  
according to the [AN-1349 Application Note](#)

[ADM2587E](#) passes EN55022 Class A (certification available)

[ADM2582E](#) passes EN55022 Class A (certification available)

2-layer printed circuit board (PCB) layout that minimizes PCB material cost

Convenient connections for power and signal through screw terminal blocks

Configurable as half-duplex or full-duplex

5 V or 3.3 V operation

Easily configurable through jumper connections

Test points for measuring all signals

### EVALUATION KIT CONTENTS

[EVAL-ADM2582EEMIZ](#) or [EVAL-ADM2587EEMIZ](#)

### DOCUMENTS NEEDED

[AN-1349 Application Note](#)

[ADM2582E/ADM2587E data sheet](#)

### GENERAL DESCRIPTION

The [ADM2582E/ADM2587E](#) evaluation board can easily evaluate the [ADM2582E](#) and [ADM2587E](#) power and signal isolated RS-485/RS-422 transceivers. Screw terminal blocks provide convenient connections for the power and signal connections. The evaluation board is easily configured through jumper connections. The board can be used in half-duplex or full-duplex configurations and has a  $120\ \Omega$  termination resistor fitted on the receiver input. The evaluation board can be used with either the [ADM2582E](#) 16 Mbps device or the [ADM2587E](#) 500 kbps device. The driver and receiver are enabled and disabled by jumper connections. Test points are included on the power and signal lines on both sides of the isolation barrier.

### EN55022 RADIATED EMISSIONS

The [ADM2582E/ADM2587E](#) evaluation board is designed to reduce emissions generated by the high frequency switching elements used by the *isoPower*® technology to transfer power through the [ADM2582E/ADM2587E](#) integrated transformer. The layout of the evaluation board is generated using the guidelines provided in the [AN-1349 Application Note](#), *PCB Implementation Guidelines to Minimize Radiated Emissions on the ADM2582E/ADM2587E RS-485/RS-422 Transceivers*. The [ADM2587E](#) and [ADM2582E](#) evaluation boards are tested and certified to pass EN55022 Class A.

### EVALUATION BOARD PHOTOGRAPH

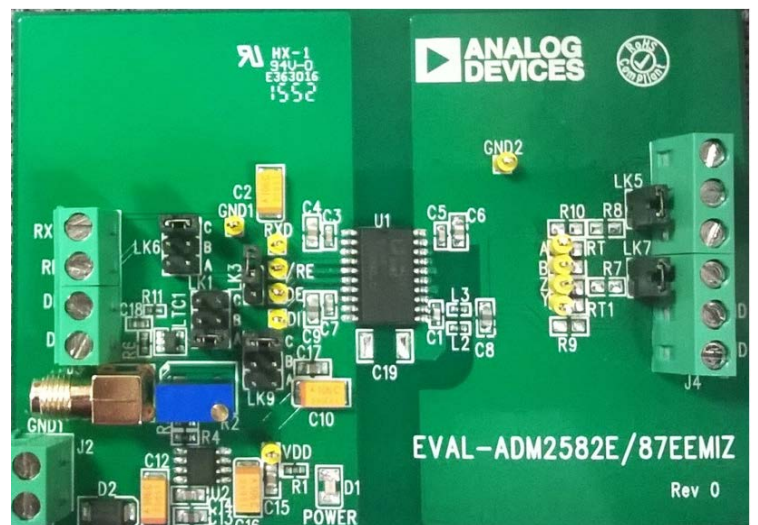


Figure 1.

## TABLE OF CONTENTS

|                                  |   |                                                   |    |
|----------------------------------|---|---------------------------------------------------|----|
| Features .....                   | 1 | Termination and Pull-Up/Pull-Down Resistors ..... | 4  |
| Evaluation Kit Contents.....     | 1 | Decoupling and Reservoir Capacitors.....          | 4  |
| Documents Needed.....            | 1 | Board Internal Layer Thickness .....              | 4  |
| General Description .....        | 1 | PCB Layout Reccomendations .....                  | 4  |
| EN55022 Radiated Emissions ..... | 1 | EN55022 Radiated Emissions Test Results .....     | 5  |
| Evaluation Board Photograph..... | 1 | Evaluation Board Schematics and Artwork.....      | 8  |
| Revision History .....           | 2 | Ordering Information.....                         | 10 |
| Evaluation Board Hardware.....   | 3 | Bill of Materials.....                            | 10 |
| Test Setup.....                  | 3 | Related Links.....                                | 11 |
| Jumper Settings.....             | 3 |                                                   |    |

## REVISION HISTORY

5/2016—Revision 0: Initial Version

## EVALUATION BOARD HARDWARE

### TEST SETUP

The [ADM2582E/ADM2587E](#) evaluation board is shown in Figure 2 with the default jumper settings on the LK1 through LK9 jumper blocks. In the default jumper connections, both the [ADM2582E/ADM2587E](#) driver and receiver are enabled. Figure 2 also shows the power connection on the J2 terminal block, input signal connection on the DI jack, and probes attached to the RXD, DI, Y, and Z test points for a loopback test (LK5 and LK7 are closed to connect A to Y pins and B to Z pins, respectively).

### JUMPER SETTINGS

The inputs to the [ADM2582E/ADM2587E](#) can be configured using the jumpers on the evaluation board (see Table 1). Do not place multiple jumper blocks on the LK1, LK3, and LK6 jumper blocks because the input sources may be shorted together. For each link, a single jumper block can move from one position to another, as specified in Table 1.

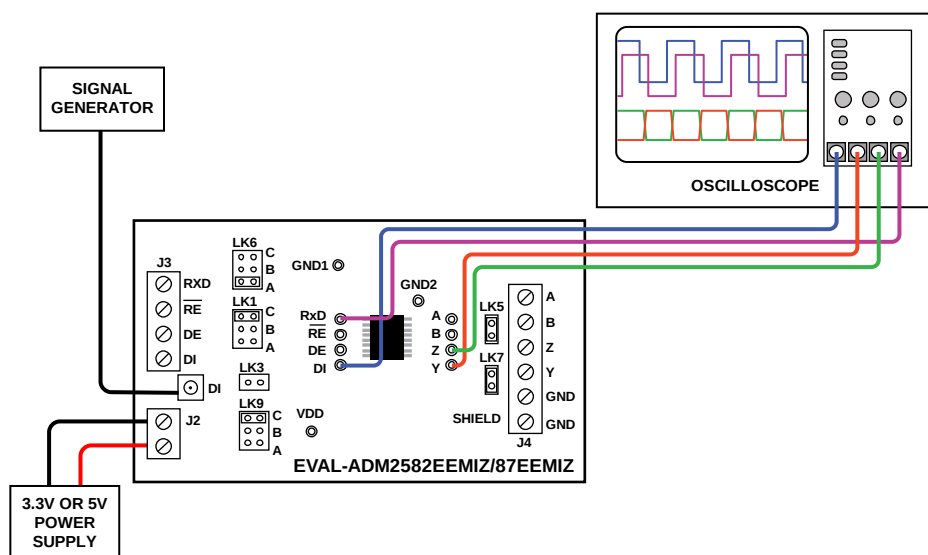


Figure 2. Basic Operation of the EN55022 Class A Compliant Evaluation Board for the [ADM2582E/ADM2587E](#) Isolated RS-485/RS-422 Transceivers

Table 1. Jumper Configuration

| Link | Connection | Description                                                                                                                                                                                                                                                                      |
|------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LK1  | A          | Connects the driver enable input (DE) of the <a href="#">ADM2582E/ADM2587E</a> to V <sub>CC</sub> pin. This setting enables the driver.                                                                                                                                          |
|      | B          | Connects the driver enable input (DE) of the <a href="#">ADM2582E/ADM2587E</a> to the DE J3 terminal block connector.                                                                                                                                                            |
|      | C          | Connects the driver enable input (DE) of the <a href="#">ADM2582E/ADM2587E</a> to GND <sub>1</sub> pin. This setting disables the driver.                                                                                                                                        |
| LK6  | A          | Connects the receiver enable input ( $\overline{\text{RE}}$ ) of the <a href="#">ADM2582E/ADM2587E</a> to V <sub>CC</sub> pin. This setting disables the receiver.                                                                                                               |
|      | B          | Connects the receiver enable input ( $\overline{\text{RE}}$ ) of the <a href="#">ADM2582E/ADM2587E</a> to the $\overline{\text{RE}}$ J3 terminal block connector.                                                                                                                |
|      | C          | Connects the receiver enable input ( $\overline{\text{RE}}$ ) of the <a href="#">ADM2582E/ADM2587E</a> to GND <sub>1</sub> pin. This setting enables the receiver.                                                                                                               |
| LK3  | Closed     | Connects the receiver enable input ( $\overline{\text{RE}}$ ) of the <a href="#">ADM2582E/ADM2587E</a> to the driver enable input (DE). This setting ensures that when the driver is enabled, the receiver is disabled, or when the driver is disabled, the receiver is enabled. |
| LK9  | A          | Connects the TxD pin of the <a href="#">ADM2582E/ADM2587E</a> to the DI connector.                                                                                                                                                                                               |
|      | B          | Connects the TxD pin of the <a href="#">ADM2582E/ADM2587E</a> to the DI J3 terminal block connector.                                                                                                                                                                             |
|      | C          | Connects the TxD pin of the <a href="#">ADM2582E/ADM2587E</a> to the on-board oscillator circuit.                                                                                                                                                                                |
| LK5  | Closed     | Connects the <a href="#">ADM2582E/ADM2587E</a> Receiver Input B to Driver Output Z. When LK5 and LK7 are both connected, the evaluation board is configured for half-duplex operation.                                                                                           |
|      | Open       | When LK5 and LK7 are both open, the evaluation board is configured for full-duplex operation.                                                                                                                                                                                    |
| LK7  | Closed     | Connects the <a href="#">ADM2582E/ADM2587E</a> Receiver Input A to Driver Output Y. When LK5 and LK7 are both connected, the evaluation board is configured for half-duplex operation.                                                                                           |
|      | Open       | When LK5 and LK7 are both open, the evaluation board is configured for full-duplex operation.                                                                                                                                                                                    |

## TERMINATION AND PULL-UP/PULL-DOWN RESISTORS

The evaluation board includes the RT and RT1 footprints for fitting termination resistors between the A and B receiver inputs and the Y and Z driver outputs. By default, the board is not fitted with a 120  $\Omega$  resistor, RT, between A and B. This resistor must be removed if the board is connected to a bus that is already terminated at both ends. For more information about proper termination, see the [AN-960 Application Note](#), *RS-485/RS-422 Circuit Implementation Guide*.

Although the [ADM2582E/ADM2587E](#) have a built-in receiver fail-safe for the bus idle condition, there are footprints on the evaluation board for fitting the R9 and R10 pull-up resistors to the  $V_{ISOOUT}$  supply of the [ADM2582E/ADM2587E](#) on A and Y, as well as the R7 and R8 pull-down resistors to  $GND_2$  on B and Z. These resistors can be fitted if the user is connecting to other devices that require external biasing resistors on the bus. The exact value required for a 200 mV minimum differential voltage in the bus idle condition depends on the supply voltage (for example, 960  $\Omega$  for 3.3 V and 1440  $\Omega$  for 5 V).

For more information about the bus idle fail-safe, see the [AN-960 Application Note](#), *RS-485/RS-422 Circuit Implementation Guide*.

## DECOUPLING AND RESERVOIR CAPACITORS

The evaluation board uses the following decoupling and reservoir capacitors:

- On the logic side of the board, the C3 and C4 capacitors must be 10 nF and 100 nF ceramic capacitors, respectively, and the C2 capacitor must be a 10  $\mu$ F tantalum capacitor.
- On the logic side of the board, the C7 capacitor must be a 100 nF ceramic capacitor, and the C9 capacitor must be a 10  $\mu$ F tantalum capacitor.
- On the logic side of the board additional capacitors are added for the power regulation circuits. C12, C13, and C16 must be a 10  $\mu$ F tantalum capacitors, while C14 and C15 must be 100 nF ceramic capacitors.
- On the bus side of the board, the C5 and C6 capacitors must be 10 nF and 100 nF, respectively, and the C1 and C98 capacitors must be 100 nF and 10  $\mu$ F, respectively.

## BOARD INTERNAL LAYER THICKNESS

The [ADM2582E/ADM2587E](#) evaluation board consists of two layers. The spacing between the top and bottom layer is 1.6 mm.

The [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) PCB has a layer spacing of 0.4 mm between Layer 1 and Layer 2, meeting requirements for isolation standards IEC 61010, third edition, and IEC 60950 in the [AN-1109 Application Note](#), *Recommendations for Control of Radiated Emissions with iCoupler Devices*.

## PCB LAYOUT RECCOMENDATIONS

The [ADM2582E/ADM2587E](#) evaluation board is designed to reduce emissions generated by the high frequency switching elements used by the *isoPower* technology to transfer power through the [ADM2582E/ADM2587E](#) integrated transformer. The layout of the evaluation board is generated using the guidelines provided in the [AN-1349 Application Note](#).

The [AN-1349 Application Note](#) provides examples of 4-layer PCBs. The [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) PCB layout is a 2-layer PCB. To pass EN55022 Class A on a 2-layer PCB, the following layout guidelines are recommended:

- Ensure that there is good decoupling on the PCB (see the Decoupling and Reservoir Capacitors section).
- Place a ferrite bead between the PCB trace connections and the following IC pins:  $V_{ISOOUT}$  (Pin 12) and  $GND_2$  (Pin 11 and Pin 14).
- Do not connect the  $V_{ISOOUT}$  pin to a power plane; connect between  $V_{ISOOUT}$  and  $V_{ISOIN}$  using a PCB trace. Ensure  $V_{ISOIN}$  (Pin 19) is connected through the L3 ferrite to  $V_{ISOOUT}$  (Pin 12) as shown in Figure 3.
- Place a high voltage discrete capacitor connected between  $GND_1$  (Pin 10) and  $GND_2$  (Pin 11). The [EVAL-ADM2582EEMIZ](#) requires a high voltage discrete capacitor in order to pass EN 55022 Class A with adequate margin to allow for test variation. However, the [EVAL-ADM2587EEMIZ](#) can pass EN 55022 Class A without a high voltage discrete capacitor. Adding a high voltage discrete capacitor to the [EVAL-ADM2587EEMIZ](#) allows a larger pass margin from the EN55022 Class A limits.

The following additional notes apply to the PCB layout; refer to the schematic and artwork in Figure 10 to Figure 13.

- Ensure  $GND_2$  (Pin 14) is connected to  $GND_2$  (Pin 11) on the inside (device side) of the C1 100 nF capacitor.
- Ensure the C1 capacitor is connected between  $V_{ISOOUT}$  (Pin 12) and  $GND_2$  (Pin 11) on the device side of the L2 and L3 ferrites.
- Ensure  $GND_2$  (Pin 16) is connected to  $GND_2$  (Pin 11) on the outside (bus side) of the L2 ferrite as shown in Figure 3.
- Ensure that there is a keep out area for the  $GND_2$  plane in the PCB layout around the L2 and L3 ferrites. The keep out area means there must not be a  $GND_2$  fill on any layer below the L2 and L3 ferrites.
- Ensure there is a minimum of 4 mm separation gap between the  $GND_2$  plane fill and the  $GND_2$  fill for the C19 high voltage discrete capacitor pad.

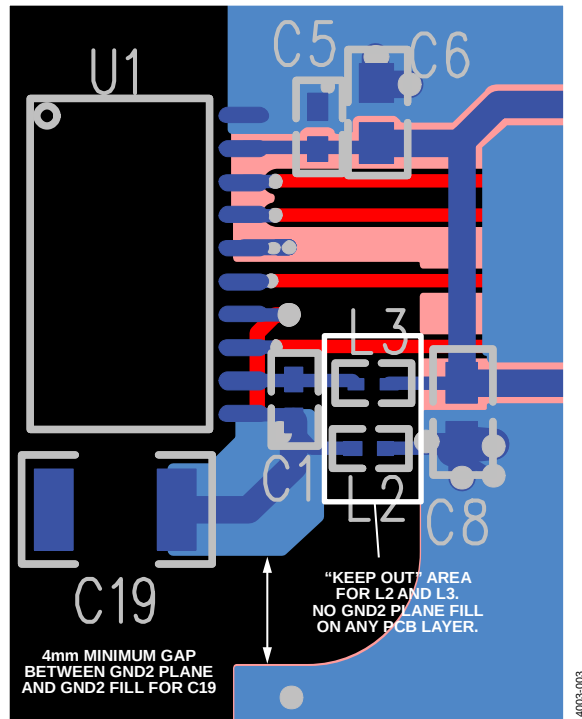


Figure 3. Layout Notes for [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#)

- Locate the power delivery circuit in close proximity to the [ADM2587E/ADM2582E](#) device, so the  $V_{CC}$  trace is as short as possible. The [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) PCB has a power delivery circuit located at the bottom of the PCB with a short trace from the [ADP667ARZ](#) regulator output to  $V_{CC}$  (Pin 8). This layout example minimizes the loop area in which high frequency current can flow. An increase in the loop area results in an increase in the emissions levels.

### EN55022 RADIATED EMISSIONS TEST RESULTS

The [ADM2587E](#) evaluation board is tested and certified to pass EN55022 Class A with  $>6$  dB $\mu$ V margin. The [ADM2582E](#) evaluation board is tested and certified to pass EN55022 Class A. EN55022 Certification documents for the [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) evaluation boards are available to customers upon request from Analog Devices, Inc.

Table 3 provides a summary of the capability of the [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) evaluation boards. All EN55022 radiated emissions tests are performed with the PCB schematic and layout as described in Figure 10 to Figure 13. The C19 capacitor (See Figure 10) high voltage discrete capacitor is removed for some tests. Table 2 describes the effect of removing or adding the capacitor.

Table 2. EN55022 Test Results Summary

| Device                   | Configuration  | EN 55022 Result                                    |
|--------------------------|----------------|----------------------------------------------------|
| <a href="#">ADM2587E</a> | C19 not fitted | Pass Class A (3.9 dB $\mu$ V margin)               |
| <a href="#">ADM2582E</a> | C19 not fitted | Pass Class A (1.2 dB $\mu$ V margin)               |
| <a href="#">ADM2582E</a> | C19 fitted     | Pass Class A (with a larger 7.5 dB $\mu$ V margin) |

The [EVAL-ADM2582EEMIZ](#) and [EVAL-ADM2587EEMIZ](#) evaluation boards are configured and tested with 3.3 V  $V_{CC}$  or 5.0 V  $V_{CC}$  power supplied to the [ADM2582E](#) and [ADM2587E](#) devices, with the power supplied from the [ADP667ARZ](#) regulator output to  $V_{CC}$  (Pin 8). The [ADP667ARZ](#) regulator input is supplied from a standard 9 V battery. All EN55022 radiated emissions testing is performed with 9 V batteries. Testing is performed at 500 kbps clock ([ADM2587E](#)) or 16 Mbps clock ([ADM2582E](#)), with the clock supplied by the on-board oscillator. The [ADM2587E/ADM2582E](#) transceiver is connected in full-duplex mode and the bus pins are loaded with a 54  $\Omega$  termination resistor (maximum bus loading). Measurements are carried out in an anechoic chamber at 10 m from 30 MHz to 2 GHz. Figure 4 to Figure 9 show the results of the worst case horizontal scans and Table 3 to Table 8 show the tabulated quasi-peak (QP) results.

Table 3. [ADM2587E](#) 3.3V  $V_{CC}$  Test Results (Not Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB ( $\mu$ V/m) | EN55022 Class A dB ( $\mu$ V/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------------|---------------------------------|------------------|--------------------|-----------|
| 180.0040        | 26.7                     | 40                              | Horizontal       | 4                  | Pass      |
| 358.4040        | 34.0                     | 47                              | Vertical         | 3.5                | Pass      |
| 359.9560        | 43.1                     | 47                              | Horizontal       | 2.5                | Pass      |

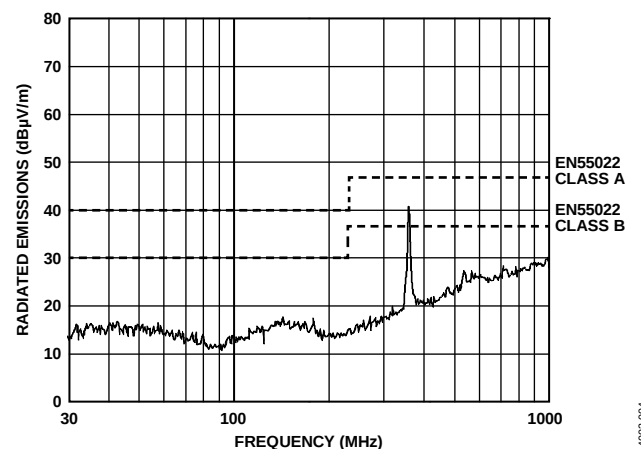


Figure 4. Horizontal Scan from 30 MHz to 1000 MHz  
(Corresponds to Worst Case for Table 3)

Table 4. **ADM2587E** 5.0 V  $V_{CC}$  Test Results (Not Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB (μV/m) | EN55022 Class A dB (μV/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------|---------------------------|------------------|--------------------|-----------|
| 199.9120        | 24.6               | 40                        | Horizontal       | 4                  | Pass      |
| 399.1040        | 43                 | 47                        | Horizontal       | 4                  | Pass      |
| 399.1280        | 32.2               | 47                        | Vertical         | 3.5                | Pass      |

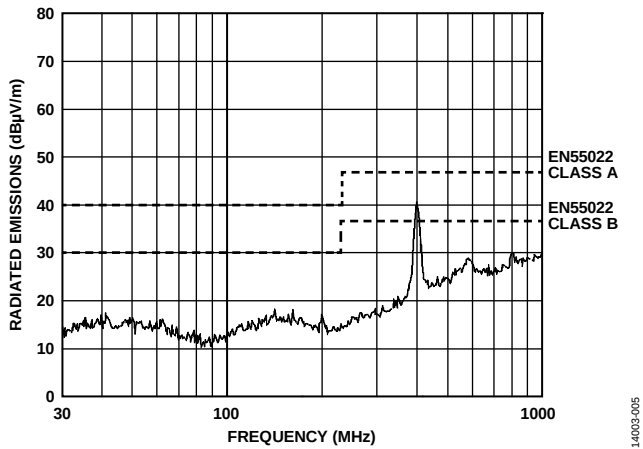


Figure 5. Horizontal Scan from 30 MHz to 1000 MHz (Corresponds to Worst Case for Table 4)

Table 5. **ADM2582E** 3.3V  $V_{CC}$  Test Results (Not Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB (μV/m) | EN55022 Class A dB (μV/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------|---------------------------|------------------|--------------------|-----------|
| 1978.996        | 27.7               | 40                        | Horizontal       | 4                  | Pass      |
| 356.948         | 45.8               | 47                        | Horizontal       | 2.5                | Pass      |
| 357.060         | 35.3               | 47                        | Vertical         | 3.2                | Pass      |
| 500.148         | 27.5               | 47                        | Horizontal       | 2                  | Pass      |
| 535.000         | 30.5               | 47                        | Horizontal       | 2                  | Pass      |
| 591.888         | 30.9               | 47                        | Horizontal       | 1.5                | Pass      |

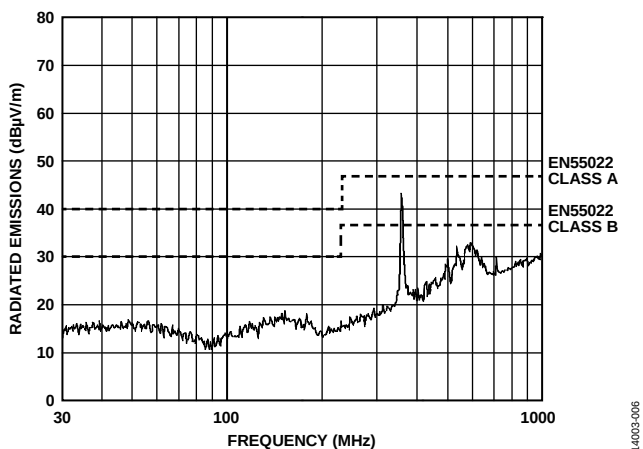


Figure 6. Horizontal Scan from 30 MHz to 1000 MHz (Corresponds to Worst Case for Table 5)

Table 6. **ADM2582E** 5.0 V  $V_{CC}$  Test Results (Not Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB (μV/m) | EN55022 Class A dB (μV/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------|---------------------------|------------------|--------------------|-----------|
| 197.904         | 25.6               | 40                        | Horizontal       | 4                  | Pass      |
| 309.536         | 24.6               | 47                        | Horizontal       | 3                  | Pass      |
| 350.776         | 28.8               | 47                        | Horizontal       | 2.5                | Pass      |
| 397.528         | 32.9               | 47                        | Vertical         | 3                  | Pass      |
| 397.676         | 42.3               | 47                        | Horizontal       | 2                  | Pass      |
| 426.356         | 20.5               | 47                        | Horizontal       | 2.5                | Pass      |
| 456.100         | 19.3               | 47                        | Horizontal       | 3                  | Pass      |
| 462.036         | 36.4               | 47                        | Horizontal       | 1.5                | Pass      |
| 497.816         | 20.2               | 47                        | Horizontal       | 2                  | Pass      |
| 568.904         | 27.5               | 47                        | Vertical         | 2                  | Pass      |
| 588.344         | 33.7               | 47                        | Horizontal       | 1.8                | Pass      |
| 634.872         | 36.0               | 47                        | Horizontal       | 1.5                | Pass      |
| 660.716         | 30.4               | 47                        | Horizontal       | 1.2                | Pass      |

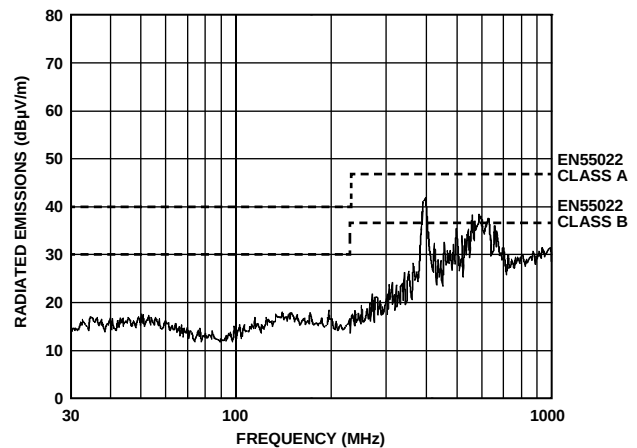


Figure 7. Horizontal Scan from 30 MHz to 1000 MHz (Corresponds to Worst Case for Table 6)

Table 7. **ADM2582E** 3.3 V  $V_{CC}$  Test Results (Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB ( $\mu$ V/m) | EN55022 Class A dB ( $\mu$ V/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------------|---------------------------------|------------------|--------------------|-----------|
| 179.120         | 26.7                     | 40                              | Horizontal       | 4                  | Pass      |
| 357.172         | 30.2                     | 47                              | Horizontal       | 3                  | Pass      |
| 559.008         | 31.7                     | 47                              | Horizontal       | 2                  | Pass      |
| 714.1080        | 27.4                     | 47                              | Horizontal       | 1.2                | Pass      |
| 892.448         | 33.3                     | 47                              | Horizontal       | 1                  | Pass      |

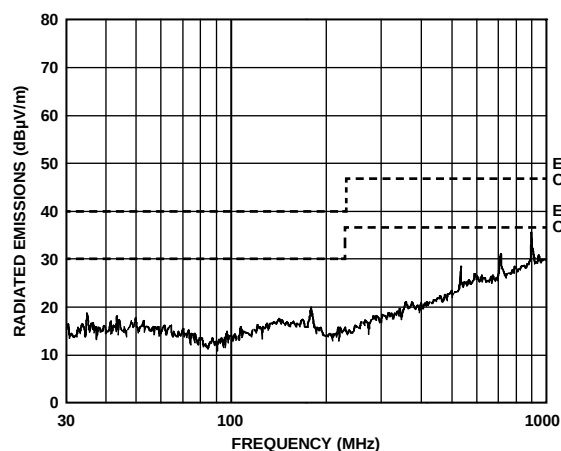


Figure 8. Horizontal Scan from 30 MHz to 1000 MHz (Corresponds to Worst Case for Table 7)

14003-008

Table 8. **ADM2582E** 5.0 V  $V_{CC}$  Test Results (Using a High Voltage Discrete Capacitor Between GND<sub>1</sub> and GND<sub>2</sub>)

| Frequency (MHz) | QP Level dB ( $\mu$ V/m) | EN55022 Class A dB ( $\mu$ V/m) | Antenna Position | Antenna Height (m) | Pass/Fail |
|-----------------|--------------------------|---------------------------------|------------------|--------------------|-----------|
| 197.740         | 23.6                     | 40                              | Horizontal       | 4                  | Pass      |
| 344.228         | 28                       | 47                              | Horizontal       | 3                  | Pass      |
| 394.000         | 30.1                     | 47                              | Horizontal       | 2.5                | Pass      |
| 425.216         | 31.6                     | 47                              | Horizontal       | 2.2                | Pass      |
| 465.760         | 32.8                     | 47                              | Horizontal       | 2                  | Pass      |
| 492.064         | 32.2                     | 47                              | Horizontal       | 2.5                | Pass      |
| 496.700         | 32.8                     | 47                              | Horizontal       | 1.8                | Pass      |
| 532.980         | 25.3                     | 47                              | Horizontal       | 2                  | Pass      |
| 537.196         | 28.5                     | 47                              | Vertical         | 3                  | Pass      |
| 537.308         | 38.8                     | 47                              | Horizontal       | 1.5                | Pass      |
| 562.532         | 38.6                     | 47                              | Horizontal       | 1.8                | Pass      |
| 577.768         | 39.1                     | 47                              | Horizontal       | 2                  | Pass      |
| 583.396         | 33.9                     | 47                              | Horizontal       | 1.5                | Pass      |
| 587.724         | 27.4                     | 47                              | Vertical         | 2.5                | Pass      |
| 588.056         | 39.5                     | 47                              | Horizontal       | 1.5                | Pass      |
| 603.648         | 33.5                     | 47                              | Horizontal       | 1.5                | Pass      |
| 608.236         | 39.0                     | 47                              | Horizontal       | 1.5                | Pass      |

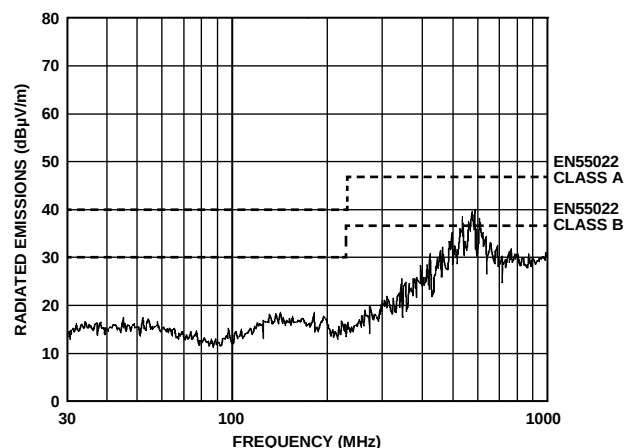


Figure 9. Horizontal Scan from 30 MHz to 1000 MHz (Corresponds to Worst Case for Table 8)

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14003-010



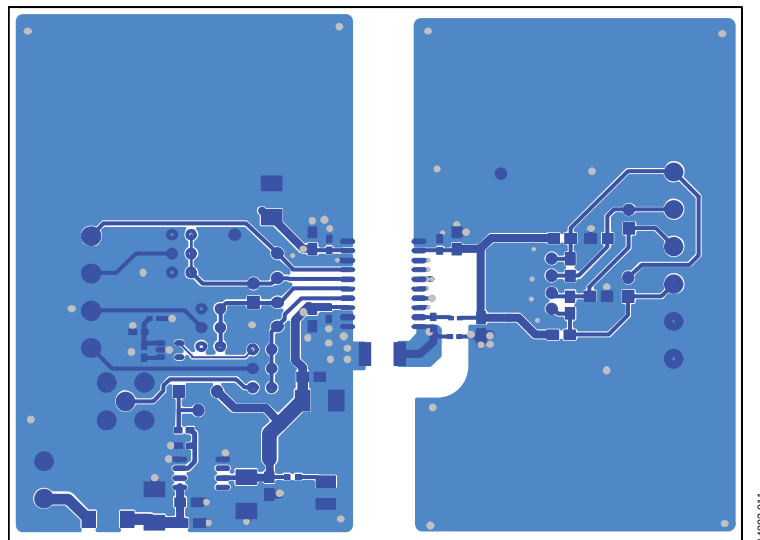


Figure 11. Top Layer

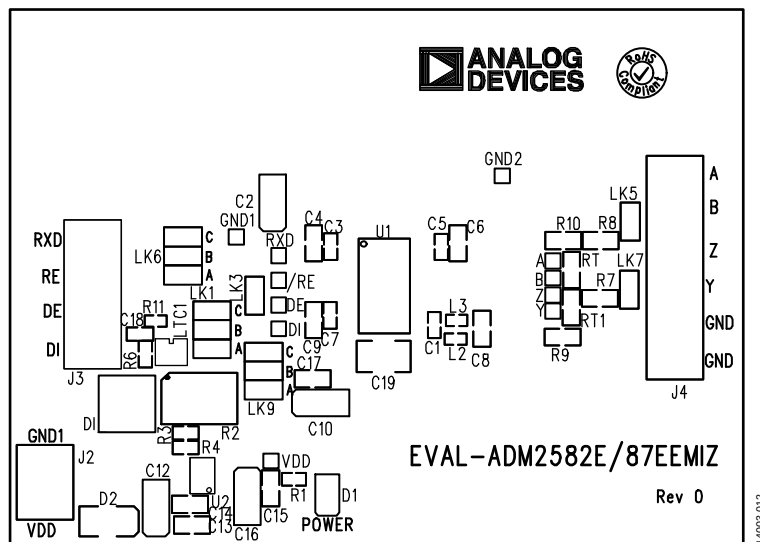


Figure 12. Silkscreen

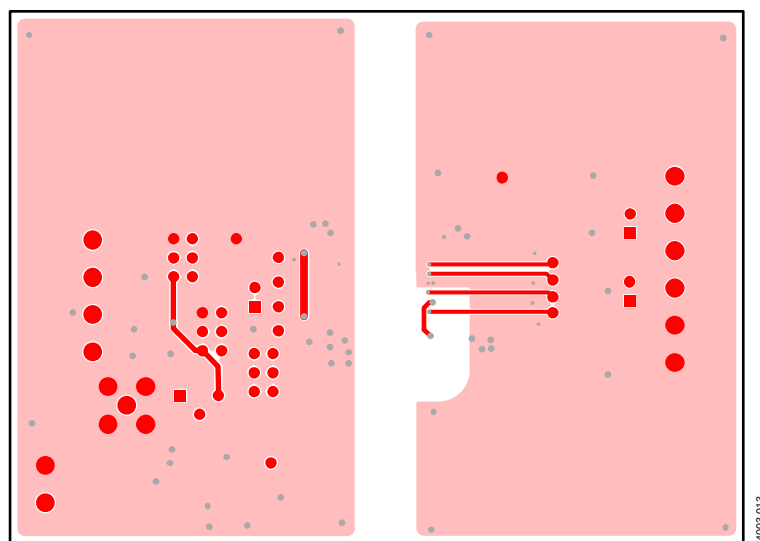


Figure 13. Bottom Layer

## ORDERING INFORMATION

## BILL OF MATERIALS

Table 9. [EVAL-ADM2582EEMIZ](#)

| Quantity | Reference Designator                                              | Description                                              | Manufacturer         | Part Number                  |
|----------|-------------------------------------------------------------------|----------------------------------------------------------|----------------------|------------------------------|
| 4        | RR7, R8, R9, R10                                                  | Resistors, size 0805 (not inserted)                      | Panasonic            | ERA6AEB122V                  |
| 1        | R11                                                               | Resistor, 0 $\Omega$ , size 0402 (not inserted)          | Multicomp            | MCMR04X000 PTL               |
| 1        | RT                                                                | Resistor, 120 $\Omega$ , size 0805 (not inserted)        | Yegeo                | RC0805JR-07120RL             |
| 1        | RT1                                                               | Resistor, 120 $\Omega$ , size 0805 (not inserted)        | Yegeo                | RC0805JR-07120RL             |
| 3        | C8, C9, C13                                                       | Capacitors, size 0805, 10 $\mu$ F                        | AVX                  | 08056C106KAT2A               |
| 5        | C4, C6, 14, C15, C17                                              | Capacitors, size 0805, 100 nF                            | Multicomp            | MC0805F104Z160CT             |
| 4        | C2, C10, C12, C16                                                 | Capacitors, tantalum, 10 $\mu$ F                         | Kemet                | B45196E3106K309              |
| 3        | C1, C7, C18                                                       | Capacitors, size 0603, 100 nF                            | Yegeo                | CC0603KRX7R7BB104            |
| 2        | C3, C5                                                            | Capacitors, size 0603, 10 nF                             | AVX                  | 0603YC103KAT2A               |
| 1        | J2                                                                | Power connector, 2-pin terminal block                    | Camdenboss           | CTB5000/2                    |
| 1        | J3                                                                | Connector, 4-pin terminal block                          | Camdenboss           | CTB5000/4                    |
| 1        | J4                                                                | Connector, 6-pin terminal block                          | Camdenboss           | CTB5000/6                    |
| 1        | LTC1                                                              | Oscillator                                               | LTC                  | LTC6900CS5#TRMPBF            |
| 1        | R1                                                                | Resistor, 0603, 1%, 560R                                 | Multicomp            | CRCW0603560RFKEAHP           |
| 1        | R2                                                                | Trimmer, potentiometer, 500 k $\Omega$ , 23TURN          | Vishay               | T93YB504KT20                 |
| 1        | R3                                                                | Resistor, 0603, 240 k $\Omega$ , 5%                      | Vishay               | CRCW0603240KFKEA             |
| 1        | R4                                                                | Resistor, 0603, 200 k $\Omega$ , 5%                      | Bourns               | CR0603-FX-2003ELF            |
| 1        | R6                                                                | Resistor, 0603, 2.49 k $\Omega$ , 0.1%                   | Multicomp            | MC0063W060312K49             |
| 3        | LK1, LK6, LK9                                                     | 6-pin (3 $\times$ 2), 2.54 mm header and shorting blocks | Harwin               | M20-9983646 and M7566-05     |
| 3        | LK3, LK5, LK7                                                     | 2-pin (1 $\times$ 2), 2.54 mm header and shorting blocks | Harwin               | M20-9990246                  |
| 1        | U1                                                                | 20-lead, wide body SOIC                                  | Analog Devices, Inc. | <a href="#">ADM2582EBRWZ</a> |
| 1        | U2                                                                | Adjustable voltage regulator                             | Analog Devices, Inc. | <a href="#">ADP667ARZ</a>    |
| 2        | LK2, LK3                                                          | Ferrite beads, 0402                                      | Taiyo Yuden          | BKH1005LM182-T               |
| 1        | DI                                                                | SMA right hand jack                                      | TE Connectivity      | 5-1814400-1                  |
| 1        | D1                                                                | LED, SMD                                                 | Avago                | HSMS-C191                    |
| 1        | D2                                                                | Schottky diode, 1 A, SMB                                 | ON Semiconductor     | MBRS130T3G                   |
| 1        | C19                                                               | Capacitor, ceramic, 1812                                 | TDK                  | C4532C0G3F101K160KA          |
| 11       | RXD, $\overline{\text{RE}}$ , DE, DI, A, B, Z, Y, VDD, GND1, GND2 | Test points, yellow                                      | Vero                 | 20-313140                    |

Table 10. EVAL-ADM2587EEMIZ

| Quantity | Reference Designator                         | Description                                              | Manufacturer         | Part Number                  |
|----------|----------------------------------------------|----------------------------------------------------------|----------------------|------------------------------|
| 4        | RR7, R8, R9, R10                             | Resistors, size 0805 (not inserted)                      | Panasonic            | ERA6AEB122V                  |
| 1        | R11                                          | Resistor, 0 $\Omega$ , size 0402 (not inserted)          | Multicomp            | MCMR04X000 PTL               |
| 1        | RT                                           | Resistor, 120 $\Omega$ , size 0805 (not inserted)        | Yegeo                | RC0805JR-07120RL             |
| 1        | RT1                                          | Resistor, 120 $\Omega$ , size 0805 (not inserted)        | Yegeo                | RC0805JR-07120RL             |
| 3        | C8, C9, C13                                  | Capacitors, size 0805, 10 $\mu$ F                        | AVX                  | 08056C106KAT2A               |
| 5        | C4, C6, 14, C15, C17                         | Capacitors, size 0805, 100 nF                            | Multicomp            | MC0805F104Z160CT             |
| 4        | C2, C10, C12, C16                            | Capacitors, tantalum, 10 $\mu$ F                         | Kemet                | B45196E3106K309              |
| 3        | C1, C7, C18                                  | Capacitors, size 0603, 100 nF                            | Yegeo                | CC0603KRX7R7BB104            |
| 2        | C3, C5                                       | Capacitors, size 0603, 10 nF                             | AVX                  | 0603YC103KAT2A               |
| 1        | J2                                           | Power connector, 2-pin terminal block                    | Camdenboss           | CTB5000/2                    |
| 1        | J3                                           | Connector, 4-pin terminal block                          | Camdenboss           | CTB5000/4                    |
| 1        | J4                                           | Connector, 6-pin terminal block                          | Camdenboss           | CTB5000/6                    |
| 1        | LTC1                                         | Oscillator                                               | LTC                  | LTC6900CS5#TRMPBF            |
| 1        | R1                                           | Resistor, 0603, 1%, 560R                                 | Multicomp            | CRCW0603560RFKEAHP           |
| 1        | R2                                           | Trimmer, POT, 500 k $\Omega$ , 23TURN                    | Vishay               | T93YB504KT20                 |
| 1        | R3                                           | Resistor, 0603, 240 k $\Omega$ , 5%                      | Vishay               | CRCW0603240KFKEA             |
| 1        | R4                                           | Resistor, 0603, 200 k $\Omega$ , 5%                      | Bourns               | CR0603-FX-2003ELF            |
| 1        | R6                                           | Resistor, 0603, 2.49 k $\Omega$ , 0.1%                   | TE Connectivity      | RP73D1J80K6BTDG              |
| 3        | LK1, LK6, LK9                                | 6-pin (3 $\times$ 2), 2.54 mm header and shorting blocks | Harwin               | M20-9983646 and M7566-05     |
| 3        | LK3, LK5, LK7                                | 2-pin (1 $\times$ 2), 2.54 mm header and shorting blocks | Harwin               | M20-9990246                  |
| 1        | U1                                           | 20-lead, wide body SOIC                                  | Analog Devices, Inc. | <a href="#">ADM2587EBRWZ</a> |
| 1        | U2                                           | Adjustable voltage regulator                             | Analog Devices, Inc. | <a href="#">ADP667ARZ</a>    |
| 2        | LK2, LK3                                     | Ferrite beads, 0402                                      | Taiyo Yuden          | BKH1005LM182-T               |
| 1        | DI                                           | SMA right hand jack                                      | TE Connectivity      | 5-1814400-1                  |
| 1        | D1                                           | LED, SMD                                                 | Avago                | HSMS-C191                    |
| 1        | D2                                           | Schottky diode, 1 A, SMB                                 | ON Semiconductor     | MBRS130T3G                   |
| 1        | C19                                          | Capacitor, ceramic, 1812                                 | TDK                  | C4532C0G3F101K160KA          |
| 11       | RXD, RE, DE, DI, A, B, Z, Y, VDD, GND1, GND2 | Test points, yellow                                      | Vero                 | 20-313140                    |

## RELATED LINKS

| Resource                 | Description                                                                                                                      |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">ADM2587E</a> | 500 kbps, 2.5 kV rms signal and power isolated RS-485/RS-422 transceivers with $\pm 15$ kV ESD Protection                        |
| <a href="#">ADM2582E</a> | 16 Mbps, 2.5 kV rms signal and power Isolated RS-485/RS-422 transceivers with $\pm 15$ kV ESD Protection                         |
| <a href="#">AN-1349</a>  | PCB Implementation Guidelines to Minimize Radiated Emissions on the <a href="#">ADM2582E/ADM2587E</a> RS-485/RS-422 Transceivers |
| <a href="#">AN-960</a>   | RS-485/RS-422 Circuit Implementation Guide                                                                                       |
| <a href="#">AN-1109</a>  | Recommendations for Control of Radiated Emissions with iCoupler® Devices                                                         |

## NOTES

**ESD Caution**

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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