

General Description

The SC2200 evaluation kits (SC2200-EVK) provide the hardware and software graphical user interface (GUI) necessary for the evaluation of the SC2200. The SC2200 belongs to the 4th-generation family of RF PA linearizers (RFPAL) that provide increased integration and functionality over the previous generations. The SC2200 is a dual-path linearizer that is a fully-adaptive, RFIN/RFOUT predistortion linearization solution optimized for a wide range of amplifiers, power levels, and communication protocols. It supports 2G to 4G standards (FDD and TDD) from 698MHz to 2700MHz, as well as an expanded range of signal bandwidths from 60MHz down to 1.2MHz. The device accepts single-ended RF signals to eliminate baluns and features a mirrored pinout facilitating design of both paths. The SC2200 uses the PA output and input signals to adaptively generate an optimized correction function to minimize the PA's distortion. Using RF-domain analog signal processing enables the SC2200 to operate over wide bandwidths and with very low power consumption. The dual linearizer can be used for small cell MIMO, active antennas, distributed antennas, or in systems requiring two different simplex bands.

Applications

- Cellular Infrastructure
 - Single/Multicarrier, Multistandard: CDMA/EVDO, TD-SCDMA, WiMAX, WCDMA/HSDPA, LTE, and TD-LTE
 - BTS Amplifiers, RRH, Booster Amplifiers, Repeaters, Small Cells, Microcells, Picocells, DAS, AAS, and MIMO Systems
- Wide Range of PAs and Output Power
 - Amplifier: Class A/AB, Doherty
 - Average PA Output Power Examples:
 - Cellular Infrastructure: 27dBm to 40dBm
 - PA Process: LDMOS, GaN, HBT, GaAs, and InGaP

Benefits

- Ease of Use
 - Integrated RFIN/RFOUT Solution
- Reduces System Power Consumption and OPEX
- Reduces BOM Costs and Total Volume
 - Smaller Power Supply, Heat Sink, and Enclosure
 - Lower Back-Off Reduces Transistor Costs

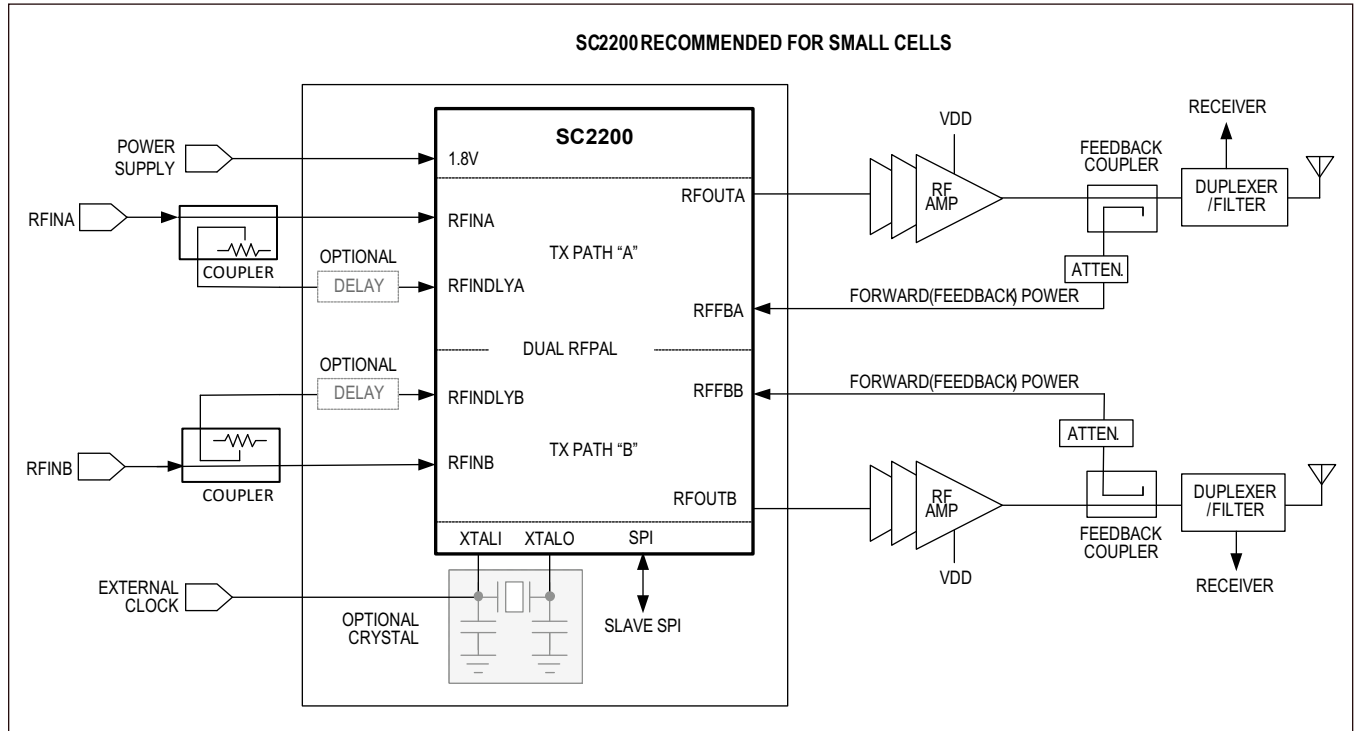
Features

- Frequency Ranges:
 - SC2200-EVK900: 698–960MHz
 - SC2200-EVK1900: 1800–2200MHz
 - SC2200-EVK2400: 2300–2700MHz
- Integrated Preamp and Single-Ended RF I/Os
- Single +5V Supply Voltage
- Dual-Path RFIN/RFOUT Linearizer
- Fully Adaptive Correction
- Up to 28dB ACLR and 38dB IMD Improvement (1)
- 1.2MHz < BWSIG ≤ 60MHz
- Requirements
 - Windows® 7 PC (or earlier) w/ USB2.0 Port
 - 5V/1A Power Supply

[Ordering Information](#) and [Block Diagram](#) appears at end of data sheet.

Windows is a registered trademark and registered service mark of Microsoft Corporation.

Typical Application Block Diagram



Ordering Information

PART NUMBER	DESCRIPTION
SC2200-EVK900	Evaluation kit, dual-RFPAL, 698MHz-960MHz
SC2200-EVK1900	Evaluation kit, dual-RFPAL, 1800MHz-2200MHz
SC2200-EVK2400	Evaluation kit, dual-RFPAL, 2300MHz-2700MHz

SC2200 EV Kit Bill of Materials—RDB900

Designator	Comment	Description	Quantity	Manufacturer 1	Manufacturer Part Number 1	Supplier 1
C100	NL	NL Cap 0402	1			
C101, C102, C130, C131	10pF	Cap 10pF 0402	4	Murata Electronics	GJM1555C1H100FB01D	Mouser
C106, C107, C120, C132	0.1uF	Cap 0.1uF 0402	4	TDK Corporation	C1005X7R1A104K050BB	Digi-Key
C108, C109, C111, C113, C114, C115, C116, C119, C126, C138, C140, C153, C155	1000pF	Cap 1000pF 0402	13	Murata Electronics	GRM1555C1H102JA01D	Mouser
C112, C118, C139, C141	2.2uF	Cap 2.2uF 0603	4	Murata Electronics	GRM188R71A225KE15J	Mouser
C122, C124	22uF	Cap 22uF 0805	2	Murata Electronics	GRM21BR60J226ME39L	Mouser
C125	5.0pF	Cap 5.0pF 0402	1	Murata Electronics	GJM1555C1H5R0BB01D	Mouser
C133, C151, C152	1uF	Cap 1uF 0402	3	Murata Electronics	GRM155R61A105KE15D	Mouser
C134	680pF	Cap 680pF 0402	1	Murata Electronics North America	GRM1555C1H681JA01D	Digi-Key
C135	10uF	Cap 10uF 0805	1	Murata Electronics North America	GRM21BR71A106KE51L	Digi-Key
C142	1uF	Cap 1uF 0603	1	Murata Electronics North America	GRM188R61A105KA61D	Digi-Key
C143, C146, C154, C156	100pF	Cap 100pF 0402	4	Murata	GRM1555C1H101JD01D	Farnell
C147, C148	5.1pF	Cap 5.1pF 0402	2	Murata Electronics	GJM1555C1H5R1BB01D	Mouser
C160, C163, C292, C293	432 Ohm	RESISTOR 432 Ohm 0402	4	Panasonic Electronic Components	ERJ-3EKF4320V	Digi-Key
C161, C162	0.5pF	Cap 0.5pF 0402	2	Murata Electronics North America	GJM1555C1HR50BB01D	Digi-Key
R110	NL	NL Res 0603	1			
R111	10	RESISTOR 10 Ohm 0402	1	Panasonic Electronic Components	ERJ-2GEJ100X	Digi-Key
R112	237k	RESISTOR 237 kOhm 0402	1	Panasonic Electronic Components	ERJ-2RKF2373X	Digi-Key
R114	118k	RESISTOR 118 kOhm 0402	1	Panasonic Electronic Components	ERJ-2RKF1183X	Digi-Key
R118	10k	RESISTOR 10k Ohm 0402	1	Yageo	RC0402FR-0710KL	Digi-Key
R121, R124, R161, R162, R167, R168, R194, R201, R252, R253, R255, R262	NL	NL Res 0402	12			
R165, R166, R195, R222, R223, R241, R250, R251, R254, R263, R300, R301	0 Ohm	RESISTOR 0 Ohm 0402	12	Yageo	RC0402JR-070RL	Digi-Key
R172, R265	49.9 Ohm	RESISTOR 49.9 Ohm 0402	2	KOA Speer	RK73H1ELTP49R9F	Mouser
R192, R193	11.5 Ohm	RESISTOR 11.5 Ohm 0402	2	Panasonic Electronic Components	ERJ-2RKF11R5X	Digi-Key
L104, L105	18nH	18nH	2	Taiyo Yuden	HK100518NJ-T	Digi-Key
DC104, DC105	5dB Coupler	Anaren 700-1000 MHz 0805, 5dB Coupler Conf-3, Anaren 700-1000 MHz 0805, 5dB Coupler Conf-4	2	Anaren	DC0710J5005AHF	RichardsonRFPD or Digi-Key
FT100, FT101, FT102, FT103	Bead 120 ohm	Bead 0603 120 ohm	4	Murata Electronics	BLM18AG121SN1D	Mouser
FT104, FT105	Bead 470 ohm	Bead 0402 470 ohm	2	Murata Electronics	BLM15BD471SN1D	Mouser
J107	Banana Jack Red	Banana Supply Connector Red	1	Deltron	571-0500	Mouser
J108	Banana Jack Black	Banana Supply Connector Black	1	Deltron	571-0100	Mouser
J112	HEADER 12	Header 50mil SMT	1	HARTING	15110122601000	Mouser
RFAUX_A, RFAUX_B, RFFB_A, RFFB_B, RFIN_A, RFIN_B, RFOUT_A, RFOUT_B	SMA_EDGE	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	8	Cinch Connectivity Solutions Johnson	142-0701-801	Digi-Key
S100	SW-PB	SW, PUSH, Omronm B3S-1000P	1	Omron Electronics Inc-EMC Div	B3S-1000	Digi-Key
U100	SC2200	SC2200	1	Maxim Integrated	SC2200A-00A00	Avnet
U102	EP53F8QI	Enpirion Voltage Regulator	1	ENPIRION	EP53F8QI	Newark
U103, U104	3ns Delay	3ns Delay Line (Anaren)	2	Anaren	XDL15-3-030S	RichardsonRFPD or Digi-Key
XTALI	NL	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	1	Johnson-Cinch Connectivity Solutions	142-0701-201	Allied
Y100	278-20.0M-20-W	Crystal 20MHz 278-20.0M-20-W	1	Oscilent	278-20.0M-20-W	Oscilent
			108			

Notes
(NL) are no load parts.

SC2200 EV Kit Bill of Materials—RDB1900

Designator	Comment	Description	Quantity	Manufacturer 1	Manufacturer Part Number 1	Supplier 1
C100, C160, C163	NL	NL Cap 0402	3			
C101, C102, C130, C131	10pF	Cap 10pF 0402	4	Murata Electronics	GJM1555C1H100FB01D	Mouser
C106, C107, C120, C132	0.1uF	Cap 0.1uF 0402	4	TDK Corporation	C1005X7R1A104K050BB	Digi-Key
C108, C109, C111, C113, C114, C115, C116, C119, C126, C138, C140, C153, C155	1000pF	Cap 1000pF 0402	13	Murata Electronics	GRM1555C1H102JA01D	Mouser
C112, C118, C139, C141	2.2uF	Cap 2.2uF 0603	4	Murata Electronics	GRM188R71A225KE15J	Mouser
C122, C124	22uF	Cap 22uF 0805	2	Murata Electronics	GRM21BR60J226ME39L	Mouser
C125	5.0pF	Cap 5.0pF 0402	1	Murata Electronics	GJM1555C1H5R0BB01D	Mouser
C133, C151, C152	1uF	Cap 1uF 0402	3	Murata Electronics	GRM155R61A105KE15D	Mouser
C134	680pF	Cap 680pF 0402	1	Murata Electronics North America	GRM1555C1H681JA01D	Digi-Key
C135	10uF	Cap 10uF 0805	1	Murata Electronics North America	GRM21BR71A106KE51L	Digi-Key
C142	1uF	Cap 1uF 0603	1	Murata Electronics North America	GRM188R61A105KA61D	Digi-Key
C143, C146, C300, C301	2.2pF	Cap 2.2pF 0402	4	Murata Electronics	GJM1555C1H2R2BB01D	Mouser
C147, C148	5.6nH	Inductor 5.6nH 0402	2	Taiyo Yuden	HK10055N6S-T	Digi-Key
C154, C156	100pF	Cap 100pF 0402	2	Murata	GRM1555C1H101JD01D	Farnell
C161, C162	0.5pF	Cap 0.5pF 0402	2	Murata Electronics North America	GJM1555C1HR50BB01D	Digi-Key
C292, C293	1.3pF	Cap 1.3pF 0402	2	Murata Electronics	GJM1555C1H1R3BB01D	Mouser
R110	NL	NL Res 0603	1			
R111	10	RESISTOR 10 Ohm 0402	1	Panasonic Electronic Components	ERJ-2GEJ100X	Digi-Key
R112	237k	RESISTOR 237 kOhm 0402	1	Panasonic Electronic Components	ERJ-2RKF2373X	Digi-Key
R114	118k	RESISTOR 118 kOhm 0402	1	Panasonic Electronic Components	ERJ-2RKF1183X	Digi-Key
R118	10k	10k Ohm 0402	1	Yageo	RC0402FR-0710KL	Digi-Key
R121, R124, R161, R162, R167, R168, R194, R201, R252, R253, R255, R262	NL	NL Res 0402	12			
R165, R166, R195, R222, R223, R241, R250, R251, R254, R263	0 Ohm	RESISTOR 0 Ohm 0402	10	Yageo	RC0402JR-070RL	Digi-Key
R172, R265	49.9 Ohm	RESISTOR 49.9 Ohm 0402	2	KOA Speer	RK73H1ELTP49R9F	Mouser
L104, L105	10nH	Inductor 10nH 0402	2	Taiyo Yuden	HK100510NJ-T	Digi-Key
L192, L193	1.0nH	Inductor 1.0nH 0402	2	Taiyo Yuden	HK10051N0S-T	Digi-Key
DC104, DC1015	5dB Coupler	Anaren 1700-2200 MHz 0805, 5dB Coupler Conf-3, Anaren 1700-2200 MHz 0805, 5dB Coupler Conf-4	2	Anaren	DC1722J5005AHF	RichardsonRFPD or Digi-Key
FT100, FT101, FT102, FT103	Bead 120 ohm	Bead 0603 120 ohm	4	Murata Electronics	BLM18AG121SN1D	Mouser
FT104, FT105	Bead 470 ohm	Bead 0402 470 ohm	2	Murata Electronics	BLM15BD471SN1D	Mouser
J107	Banana Jack Red	Banana Supply Connector Red	1	Deltron	571-0500	Mouser
J108	Banana Jack Black	Banana Supply Connector Black	1	Deltron	571-0100	Mouser
J112	HEADER 12	Header 50mil SMT	1	HARTING	15110122601000	Mouser
RFAUX_A, RFAUX_B, RFFB_A, RFFB_B, RFIN_A, RFIN_B, RFOUT_A, RFOUT_B	SMA_EDGE	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	8	Cinch Connectivity Solutions Johnson	142-0701-801	Digi-Key
S100	SW-PB	SW, PUSH, Omronm B3S-1000P	1	Omron Electronics Inc-EMC Div	B3S-1000	Digi-Key
U100	SC2200	SC2200	1	Maxim Integrated	SC2200A-00A00	Avnet
U102	EP53F8QI	Enpirion Voltage Regulator	1	Loading...	Loading...	Newark
U103, U104	3ns Delay	3ns Delay Line (Anaren)	2	Anaren	XDL15-3-030S	RichardsonRFPD or Digi-Key
XTALI	NL	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	1	Johnson-Cinch Connectivity Solutions	142-0701-201	Allied
Y100	278-20.0M-20-W	Crystal 20MHz 278-20.0M-20-W	1	Oscilent	278-20.0M-20-W	Oscilent
			108			

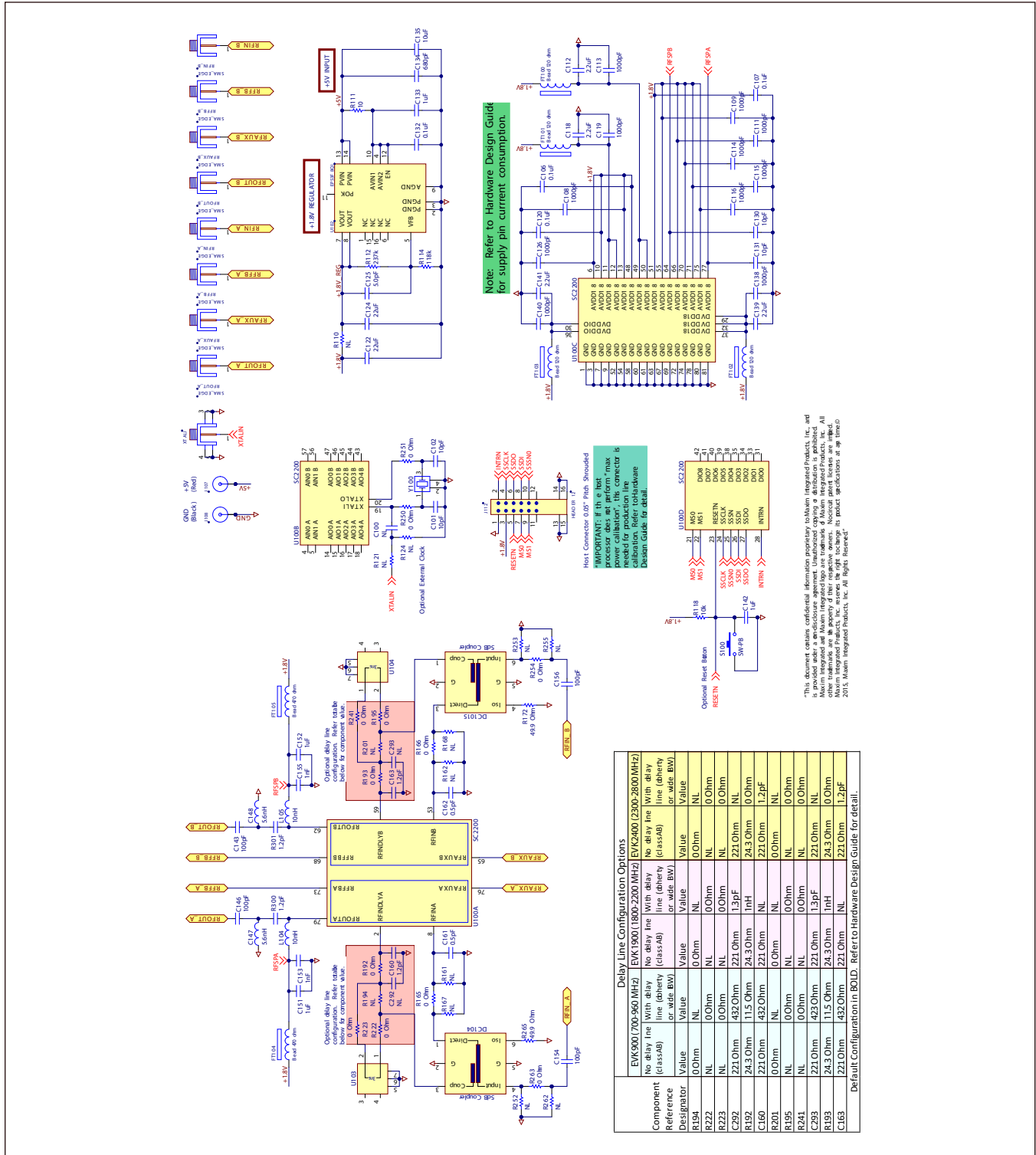
Notes:
 (NL) are no load parts.

SC2200 EV Kit Bill of Materials—RDB2400

Designator	Comment	Description	Quantity	Manufacturer 1	Manufacturer Part Number 1	Supplier 1
C100, C292, C293	NL	NL Cap 0402	3			
C101, C102, C130, C131	10pF	Cap 10pF 0402	4	Murata Electronics	GJM1555C1H100FB01D	Mouser
C106, C107, C120, C132	0.1uF	Cap 0.1uF 0402	4	TDK Corporation	C1005X7R1A104K050BB	Digi-Key
C108, C109, C111, C113, C114, C115, C116, C119, C126, C138, C140, C153, C155	1000pF	Cap 1000pF 0402	13	Murata Electronics	GRM1555C1H102JA01D	Mouser
C112, C118, C139, C141	2.2uF	Cap 2.2uF 0603	4	Murata Electronics	GRM188R71A225KE15J	Mouser
C122, C124	22uF	Cap 22uF 0805	2	Murata Electronics	GRM21BR60J226ME39L	Mouser
C125	5.0pF	Cap 5.0pF 0402	1	Murata Electronics	GJM1555C1H5R0BB01D	Mouser
C133, C151, C152	1uF	Cap 1uF 0402	3	Murata Electronics	GRM155R61A105KE15D	Mouser
C134	680pF	Cap 680pF 0402	1	Murata Electronics North America	GRM1555C1H681JA01D	Digi-Key
C135	10uF	Cap 10uF 0805	1	Murata Electronics North America	GRM21BR71A106KE51L	Digi-Key
C142	1uF	Cap 1uF 0603	1	Murata Electronics North America	GRM188R61A105KA61D	Digi-Key
C143, C146, C154, C156	100pF	Cap 100pF 0402	4	Murata	GRM1555C1H101JD01D	Farnell
C147, C148	5.6nH	Inductor 5.6nH 0402	2	Taiyo Yuden	HK10055N6S-T	Digi-Key
C160, C163, C300, C301	1.2pF	Cap 1.2pF 0402	4	Murata Electronics	GJM1555C1H1R2BB01D	Mouser
C161, C162	0.5pF	Cap 0.5pF 0402	2	Murata Electronics North America	GJM1555C1HR50BB01D	Digi-Key
R110	NL	NL Res 0603	1			
R111	10 Ohm	RESISTOR 10 Ohm 0402	1	Panasonic Electronic Components	ERJ-2GEJ100X	Digi-Key
R112	237k	RESISTOR 237k Ohm 0402	1	Panasonic Electronic Components	ERJ-2RKF2373X	Digi-Key
R114	118k	RESISTOR 118k Ohm 0402	1	Panasonic Electronic Components	ERJ-2RKF1183X	Digi-Key
R118	10k	RESISTOR 10k Ohm 0402	1	Yageo	RC0402FR-0710KL	Digi-Key
R121, R124, R161, R162, R167, R168, R194, R201, R252, R253, R255, R262	NL	NL Res 0402	12			
R165, R166, R192, R193, R195, R222, R223, R241, R250, R251, R254, R263	0 Ohm	RESISTOR 0 Ohm 0402	12	Yageo	RC0402JR-070RL	Digi-Key
R172, R265	49.9 Ohm	RESISTOR 49.9 Ohm 0402	2	KOA Speer	RK73H1ELTP49R9F	Mouser
L104, L105	10nH	Inductor 10nH 0402	2	Taiyo Yuden	HK100510NJ-T	Digi-Key
DC104, DC105	5dB Coupler	Anaren 2300-2700 MHz 0805, 5dB Coupler Conf-3, Anaren 2300-2700 MHz 0805, 5dB Coupler Conf-4	2	Anaren	DC2327J5005AHF	RichardsonRFPD or Digi-Key
FT100, FT101, FT102, FT103	Bead 120 ohm	Bead 0603 120 ohm	4	Murata Electronics	BLM18AG121SN1D	Mouser
FT104, FT105	Bead 470 ohm	Bead 0402 470 ohm	2	Murata Electronics	BLM15BD471SN1D	Mouser
J107	Banana Jack Red	Banana Supply Connector Red	1	Deltron	571-0500	Mouser
J108	Banana Jack Black	Banana Supply Connector Black	1	Deltron	571-0100	Mouser
J112	HEADER 12	Header 50mil SMT	1	HARTING	15110122601000	Mouser
RFAUX_A, RFAUX_B, RFFB_A, RFFB_B, RFIN_A, RFIN_B, RFOUT_A, RFOUT_B	SMA_EDGE	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	8	Cinch Connectivity Solutions Johnson	142-0701-801	Digi-Key
S100	SW-PB	SW, PUSH, Omronm B3S-1000P	1	Omron Electronics Inc-EMC Div	B3S-1000	Digi-Key
U100	SC2200	SC2200	1	Maxim Integrated	SC2200A-00A00	Avnet
U102	EP53F8QI	Enpirion Voltage Regulator	1	ENPIRION	EP53F8QI	Newark
U103, U104	3ns Delay	3ns Delay Line (Anaren)	2	Anaren	XDL15-3-030S	RichardsonRFPD or Digi-Key
XTALI	NL	SMA RECEPTACLE END LAUNCH, Emerson 142-0701-801	1	Johnson-Cinch Connectivity Solutions	142-0701-201	Allied
Y100	278-20.0M-20-W	Crystal 20MHz 278-20.0M-20-W	1	Oscilent	278-20.0M-20-W	Oscilent
			108			

Notes:
 (NL) are no load parts.

SC2200 EV Kit Schematic



Note: Refer to Hardware Design Guide for supply pin current consumption.

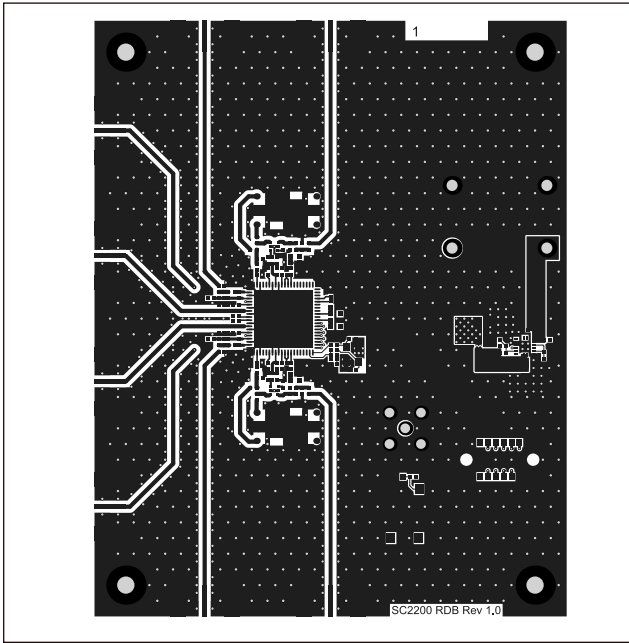
IMPORTANT: If the e-test processor does not perform MaxM calibration, refer to the Hardware Design Guide for details.

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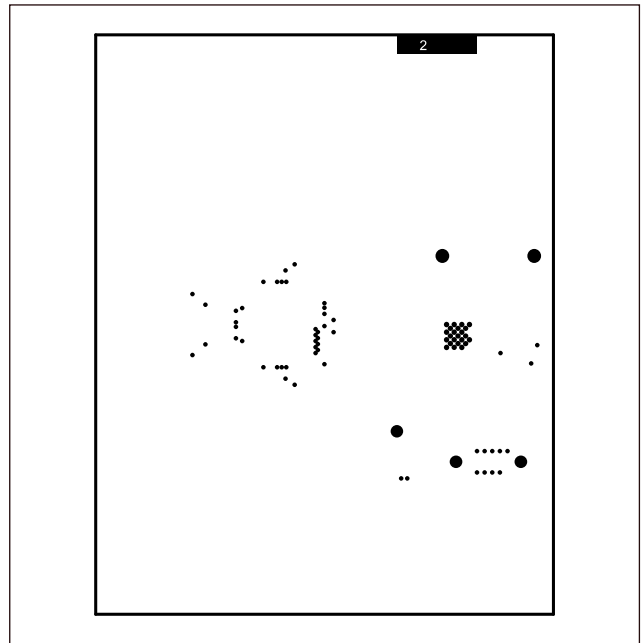
Component Reference Designator	Value	EVK500 (700-900 MHz)	EVK1900 (1800-2200 MHz)	EVK2400 (2300-2800 MHz)
R194	0 Ohm	0 Ohm	0 Ohm	0 Ohm
R222	0 Ohm	0 Ohm	0 Ohm	0 Ohm
R223	0 Ohm	0 Ohm	0 Ohm	0 Ohm
C292	221 Ohm	432 Ohm	221 Ohm	221 Ohm
R192	24.3 Ohm	11.5 Ohm	24.3 Ohm	24.3 Ohm
C160	221 Ohm	432 Ohm	221 Ohm	221 Ohm
R201	0 Ohm	0 Ohm	0 Ohm	0 Ohm
R195	0 Ohm	0 Ohm	0 Ohm	0 Ohm
R241	0 Ohm	0 Ohm	0 Ohm	0 Ohm
C293	221 Ohm	432 Ohm	221 Ohm	221 Ohm
R193	24.3 Ohm	11.5 Ohm	24.3 Ohm	24.3 Ohm
C163	221 Ohm	432 Ohm	221 Ohm	221 Ohm

Default Configuration in BOLD. Refer to Hardware Design Guide for details.

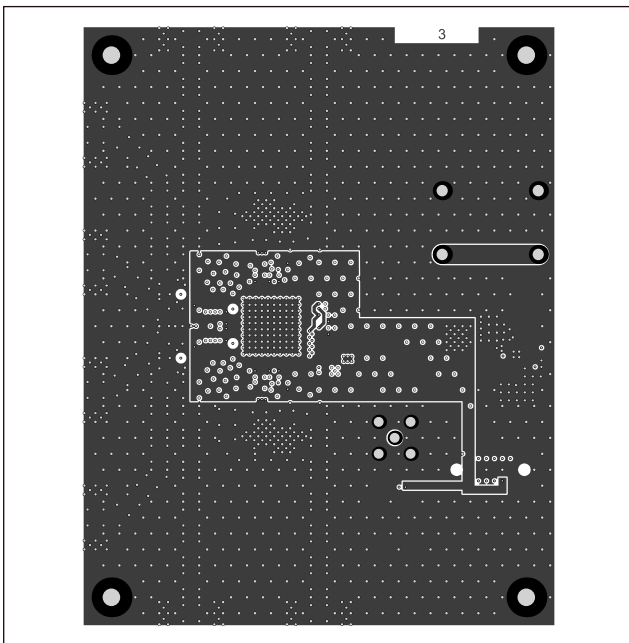
SC2200 EV Kit PCB Layout Diagrams



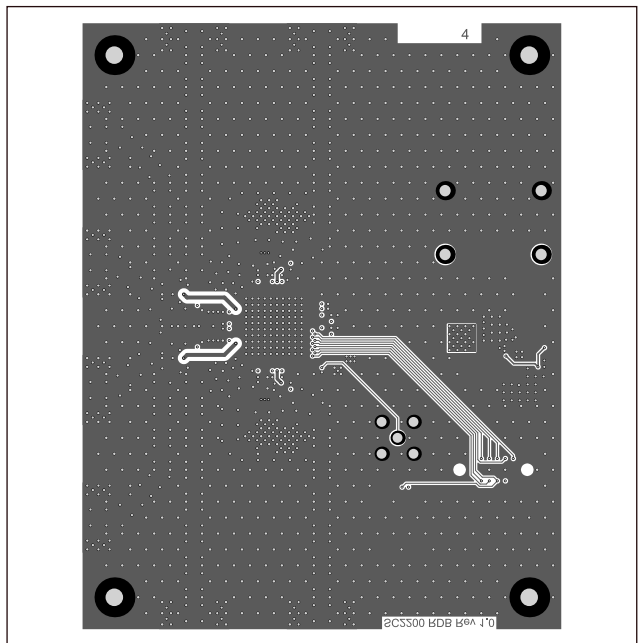
SC2200 EV Kit—Top Layer 1



SC2200 EV Kit—GND Layer 2

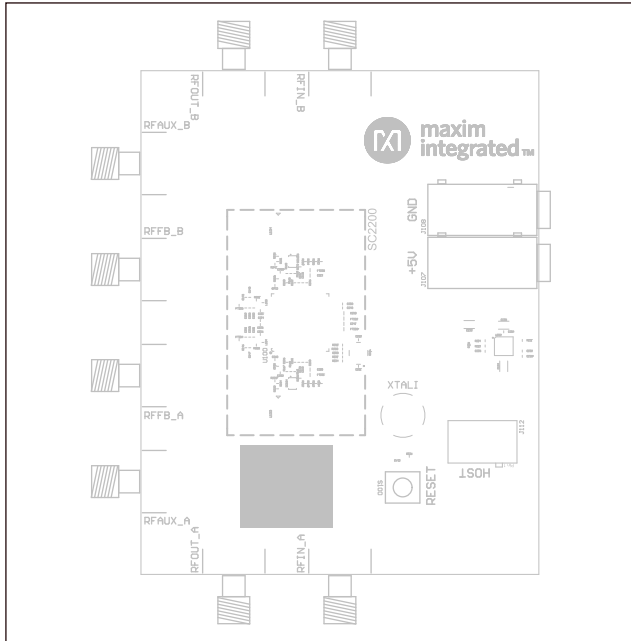


SC2200 EV Kit—Internal Layer 3

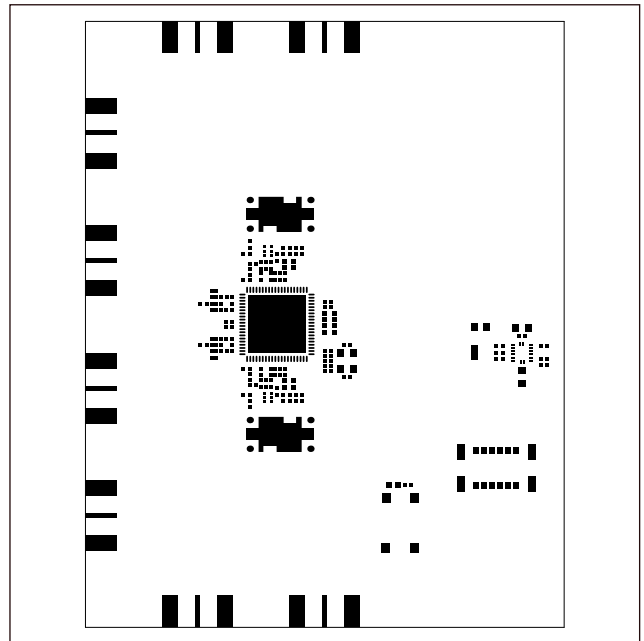


SC2200 EV Kit—Bottom Layer 4

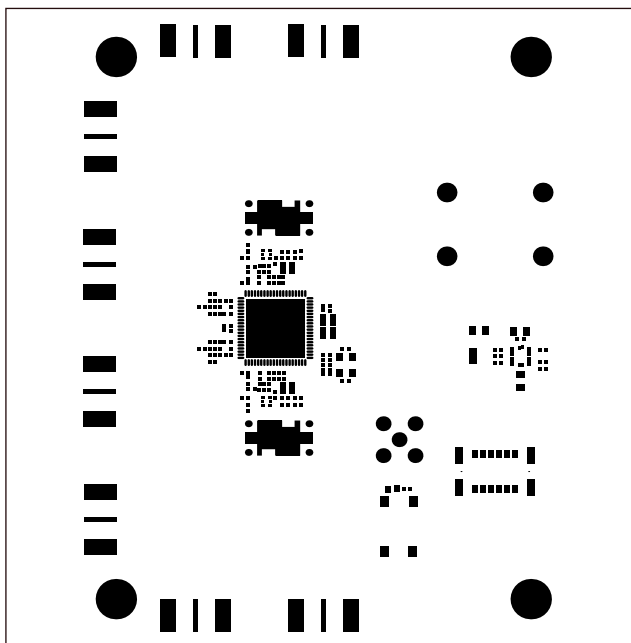
SC2200 EV Kit PCB Layout Diagrams (continued)



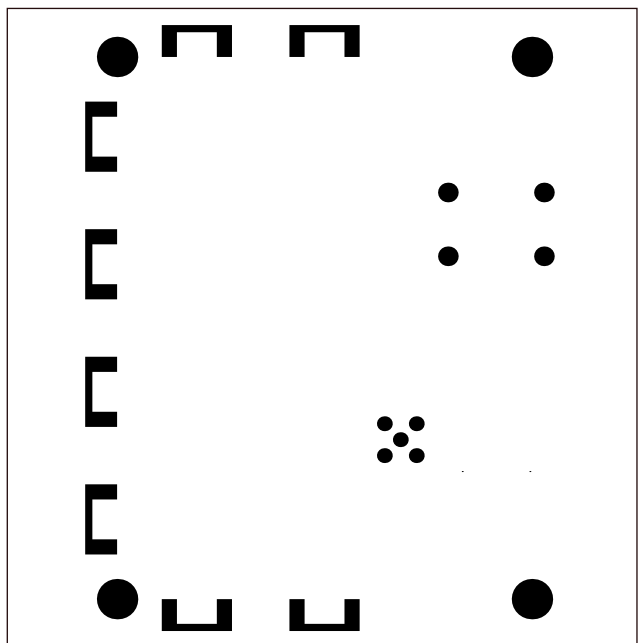
SC2200 EV Kit—Top Overlay



SC2200 EV Kit—Top Paste

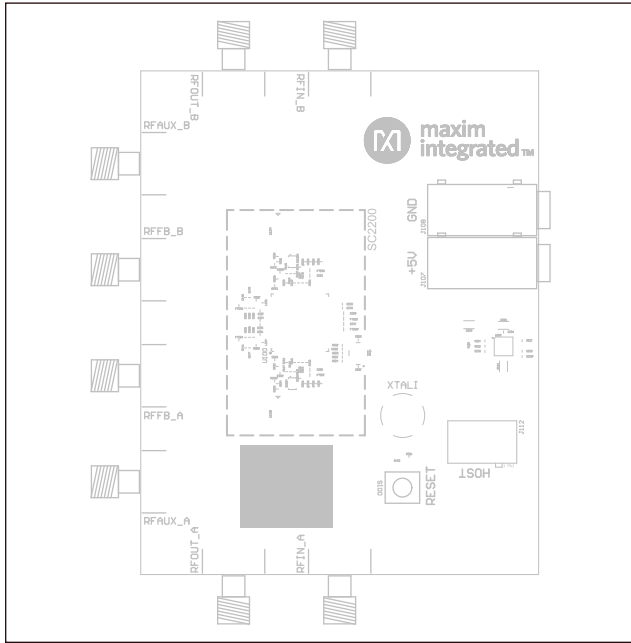


SC2200 EV Kit—Top Solder Mask

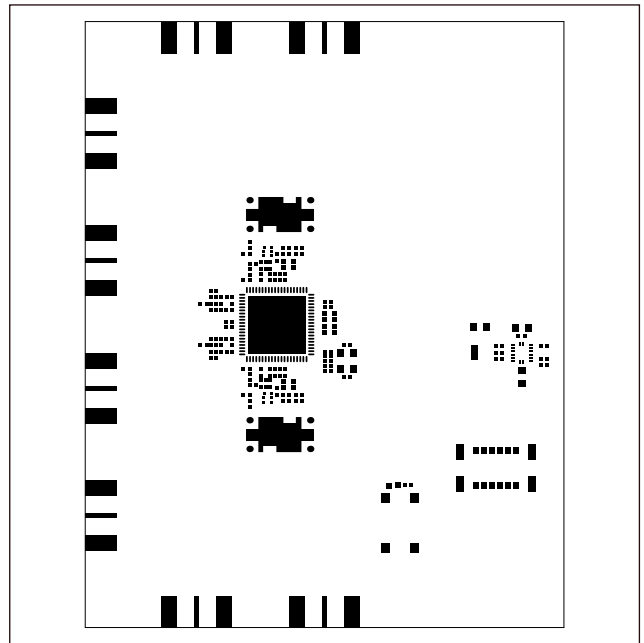


SC2200 EV Kit—Bottom Solder Mask

SC2200 EV Kit PCB Layout Diagrams (continued)



SC2200 EV Kit



SC2200 EV Kit

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	11/15	Initial release	—
1	10/17	Updated Bill of Materials and formatting of document	1–10

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[GEVB](#) [STEVAL-IKR002V2D](#) [107755-HMC454ST89](#) [DM182017-2](#) [110961-HMC453ST89](#) [SX1272MB2DAS](#) [3179](#) [DC689A](#) [DC1513B-](#)
[AB](#) [3229](#) [3230](#) [3231](#) [3232](#) [DC963B](#) [DC1250A-AA](#) [DC1513B-AC](#) [DC1513B-AD](#) [DC1513B-AA](#) [TEL0075](#) [131903-HMC921LP4E](#) [EU-](#)
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