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REFERENCE DESIGN 5364 INCLUDES: ✓Tested Circuit ✓Schematic ✓BOM ✓Description

Femtocell Radio Reference Designs Using the MAX2550–MAX2553 Transceivers

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Abstract: The MAX2550 is a complete single-chip radio transceiver for UMTS band 1 femtocell applications. The RD2550 reference design is based on the MAX2550 and contains all of the relevant components necessary to design and build a competitive radio solution to support the base-station transceiver (BTS) frequency band: 1920MHz to 1980MHz (Rx) and 2110MHz to 2170MHz (Tx). The RD2550 also supports downlink monitoring of surrounding macrocells. This enables the system to select the most suitable operating conditions (power, codes, frequencies, capacity, etc.).

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General Description

The design features the MAX2550 as the main radio frequency (RF) transceiver, along with all components necessary to complete a radio design. These components include the external power amplifiers, duplexers, TCXO, and passive components. Along with the RD2550 reference design, Maxim's complete package includes a performance report to show full compliance to the 3GPP TS25.104 home-area base-station standard. In addition to the RD2550, we also have the RD2551, RD2552, and RD2553 reference designs, which are based on the MAX2551, MAX2552, and MAX2553 transceivers and cover additional frequency bands and standards. In total, Maxim's highly integrated single-chip femtocell transceiver family covers WCDMA bands 1-6 and 8-10, and cdma2000® band class 0, 1, and 10.



Click here for an overview of the wireless components used in a typical radio transceiver.

RD2550 Reference Design Measured Performance		
Uplink Requirements		
Description	Specification	Maxim's Radio Performance
Frequency band	1920MHz to 1980MHz	Band 1
Rx sensitivity	-107dBm	Exceeds
ACS	-101dBm	Exceeds
Blocking (1900MHz to 2000MHz)	-101dBm	Exceeds
Blocking (1MHz to 12,750MHz, except 1900MHz to 2000MHz)	-101dBm	Exceeds
Intermodulation	-101dBm	Exceeds
Downlink Requirements		
Description	Specification	Measured Performance

Frequency band	2110MHz to 2170MHz	Band 1
Maximum output power	Less than +24dBm	With external PA
ACLR	-45dB/-50dB	Exceeds
Error vector magnitude	17.5%/12.5%	Exceeds

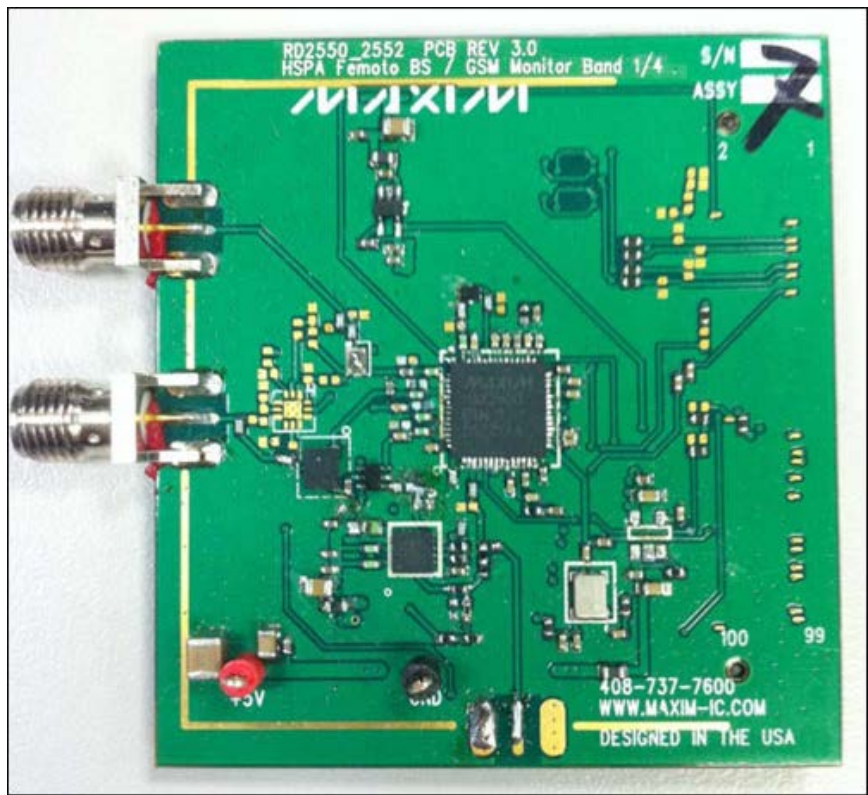
BOM

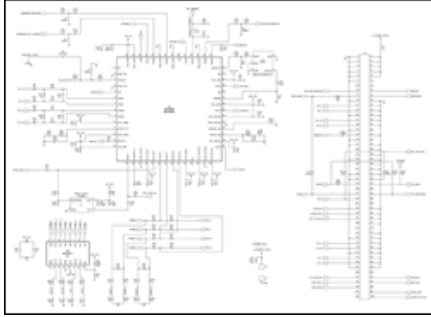
Item	Qty	Value	Description	Reference	Part Name	Manufacturer
Capacitor						
1	14	1000pF	0402 Capacitor	C1, C13, C15, C19, C28, C86, C87-90, C190, C196, C204, C216	GRM155R71H102K	Murata
2	6	100nF	0402 Capacitor	C10, C12, C22, C33, C54, C77	GRM155R61A104K	Murata
3	1	47µF	1206 Capacitor	C34	GRM32ER61C476K	Murata
4	7	1.0µF	0402 Capacitor	C16, C46, C85, C91, C92, C126, 205	GRM155R60J105K	Murata
5	1	10µF	1206 Capacitor	C32	GRM31CR60J106K	Murata
6	4	2.2µF	0603 Capacitor	C17, C38, C55, C79	GRM21BR60J225K	Murata
7	6	10nF	0402 Capacitor	C5, C26, C37, C57, C67, C123	GRM155R71E103K	Murata
8	12	100pF	0402 Capacitor	C2, C3, C4, C8, C18, C23, C24, C51, C83, C217, C193, C214	GRM1555C1H101J	Murata
9	4	0.47µF	0402 Capacitor	C27, C58, C213, C215	GRM155R71C474K	Murata
10	4	82pF	0402 Capacitor	C41, C50, C69, C81	GRM1555C1H820J	Murata
11	1	2.7pF	0402 high Q Capacitor	C25		Johanson
12	1	2.4pF	0402 high Q Capacitor	C29		Johanson
13	1	1.0pF	0402 Capacitor	C56	GRM1555C1H1R0B	Murata
14	1	68pF	0402 Capacitor	C94	GRM1555C1H680J	Murata
15	2	3.3nF	0402 Capacitor	C45, C197	GRM155R71E332K	Murata

16	1	22pF	0402 Capacitor	C35	GRM1555C1H220J	Murata
17	2	68nF	0402 Capacitor	C43, C198	GRM155R71E683K	Murata
18	1	33pF	0402 Capacitor	C65	GRM1555C1H330J	Murata
19	1	1.3nH	0402 Capacitor	C39	LQG15HN1N3S02	Murata
20	0	Open	0402 Capacitor	C7, C9, C20, C21, C31, C40, C42, C49, C52, C53, C59, C47, C48, C60, C68, C70, C72, C80, C82	Open	
21	1	5.1nH	0402 Inductor	C36	LQG15HN5N1S02	Murata
22	1	9.1nH	0402 Inductor	C14	LQG15HN9N1J02	Murata
23	1	4.3nH	0402 Inductor	C11	LQG15HN4N3S02	Murata
24	2	4.7μF	0805 Capacitor	C6, C30	GRM21BR60J475K	Murata
25	4	2.2μF	0603 Capacitor	C17, C38, C55, C79	GRM21BR60J225K	Murata
26	1	200mA	0603 Ferrite Bead	L2	BLM18HK471SN1	Murata
27	3	400mA	0603 Ferrite Bead	L14, L22, L24	BLM18PG330SN1	Murata
Resistor						
28	14	0	0402 Resistor	R2, R8, R9, R33, R36, R37, R41-44, R47-49, R55		
29	1	4.7K	0402 Resistor	R10		
30	1	430	0402 Resistor	R18		
31	1	10	0402 Resistor	R22		
32	2	220	0402 Resistor	R23, R115		
33	1	270	0402 Resistor	R27		
34	1	1K	0402 Resistor	R45		
35	1	50	0402 Resistor	R28		

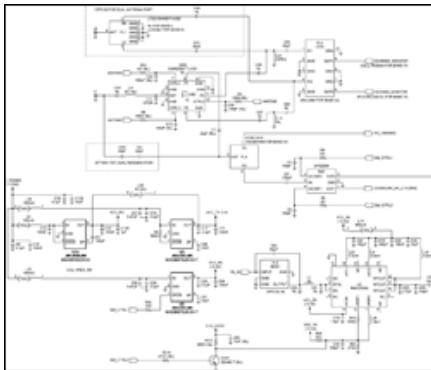
36	0	Open	0402 Resistor	R1, R3, R5-7, R11-17, R19-21, R24-26, R29-32, R34, R35, R38-40, R46, R50, R51, R52, R53, R54, R310, R311		
37	1	100	0402 Resistor	R4		
Inductor						
38	3	5.6nH	0402 Inductor	L9, L10, L23	LQG15HN5N6S02	Murata
39	1	1nH	0402 Inductor	L25	LQG15HN1N0S02	Murata
40	1	4.3nH	0402 Inductor	L13	LQG15HN4N3S02	Murata
41	5	0Ω	0402 Resistor	L3, L17-20		
42	0	OPEN	0402 Inductor	L1, L4, L5, L6-8, L11, L12, L15, L21, L16	OPEN	
43	1	OPEN	NPN Transistor	Q301	2SC4617	ROHM
IC and Connector						
44	1	Dual SAW	EGSM/DCS RF SAW	FL3	LX14	EPCOS
45	1	RX SAW	2140MHz	FL5	B9451	EPCOS
46	1	TX SAW	1950MHz RF SAW	FL8	B9414	EPCOS
47	1	Duplexer	Band1 Fbar Duplexer	FL4	ACMD7614	Avago
48	1		LOW POWER LINEAR AMPLIFIER	U2	RMX2550M	Richwave
49	1		Low Noise Low Dropout Linear	U14	MAX8510EXK33	Maxim
50	0	OPEN	QUAD LVDS	U4	MAX9173EUE	Maxim
51	1		5 Band UMTS Transmitter	U1	MAX2550	Maxim
52	1		Low Noise Low Dropout Linear	U3, U5	MAX8887EZK33	Maxim

53	1		100 Pin Connector	J3	QSS-050-01-F-D-A-K	SAMTEC
54	1		RF Switch, SP2T	SW1	UPG2009	NEC
55	1	19.2MHz	TCXO 19.2MHz	Y1	M0101-T-002-3	Taitien
56	0	OPEN	Single pull 3 throw switch	SW2	XM0825SF-TL1301	Murata
57	3	Connector	SMA Connector	J1, J6, J7	142-0711-846	Johanson
58	1	Test point Red	VCC	J4	5000	Keystone
59	1	Test point Black	GND	J5	5001	Keystone





[More detailed image.](#) (PDF, 331kB)



[More detailed image.](#) (PDF, 332kB)

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Related Parts

MAX2550	Band I, V, and VIII WCDMA Femtocell Transceiver with GSM Monitoring	Free Samples
MAX2551	Band II and V WCDMA Femtocell Transceiver with GSM Monitoring	Free Samples
MAX2552	Complete Single-Chip Femtocell Radio Transceiver for WCDMA Band 4	Free Samples
MAX2553	Band Class 0, 1, and 10 cdma2000 Femtocell Transceiver	Free Samples

More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

Application Note 5364: <http://www.maximintegrated.com/an5364>

REFERENCE DESIGN 5364, AN5364, AN 5364, APP5364, Appnote5364, Appnote 5364

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