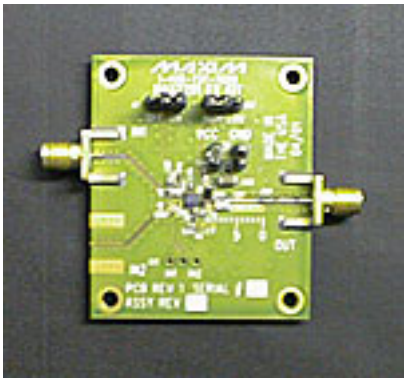
May 01, 2002

REP034: The MAX2291 RF PA for Korea PCS Band N-CDMA Applications

The MAX2291 power amplifier (PA) evaluation board was retuned for operation in the Korean PCS band of 1750 to 1780MHz. With -49dBm ACP1, it achieved 36mA idle current and 11% power-added efficiency at low power mode (+16dBm output), and 35% efficiency at high power mode (+27dBm output).

Rapid engineering prototypes are real circuits that Maxim application engineers have built and measured in our labs. They can provide a starting point for new RF designs. They are not available as evaluation kits.

Additional Information: Wireless Product Line Page
Applications Technical Support



Objective: To tune linear power amplifier for Korea PCS band N-CDMA applications.

The MAX2291 EV board was retuned for operation in the Korean PCS band of 1750 to 1780MHz. With -49 dBm ACP1, it achieved 36mA idle current and 11% power-added efficiency at low power mode (+16dBm output), and 35% efficiency at high power mode (+27dBm output) .

The MAX2291 is a single-supply, low-voltage linear power amplifier designed for 1.9GHz PCS

band applications. Its low power mode provides up to +15dBm output power, greatly extending average talk time. It offers +27dBm output power with good linearity in high power mode. The device eliminates the need for an external regulator by integrating a precision voltage reference. The MAX2291 is available in a unique ultra-small UCSP package.

Performance Matrix

Board #01 @ 1765MHz for High-Power Mode

Spec Item	Measured Result	Qualification
Usable Frequency	1750 - 1780MHz	Korea Band
Linear Gain	27dB	Pin = 1.04dBm
Linear Output Power	28.0dBm	
Total Linear Efficiency	35%	
ACPR @ offset = 1.25MHz in 30kHz BW	-50.2dBc	
ALT2 @ offset = 2.25MHz in 30kHz BW	-61.6dBc	
Power Supply Voltage	3.4V	
DC Supply Current	532mA	
Idle Current	169mA	

Board #01 @ 1765MHz for Low-Power Mode

Spec Item	Measured Result	Qualification
Usable Frequency	1750 - 1780MHz	Korea Band
Linear Gain	16.6dB	Pin = -0.86dBm
Linear Output Power	16.0dBm	
Total Linear Efficiency	11	
ACPR @ offset = 1.25MHz in 30kHz BW	-49.3dBc	
ALT2 @ offset = 2.25MHz in 30kHz BW	-61.3dBc	
Power Supply Voltage	3.4V	
DC Supply Current	109mA	
Idle Current	36mA	

Measurement Result

Board #1 High-Power Mode

Frequency (GHz)	Pin (dBm)	Pout (dBm)	Icc (MA)	Eff (%)	Gain (DB)	ACPR (dBc)	ALT1 (dBc)

1750	0.74	28.0	540	34	27.3	-50.8	-61.6
1765	1.04	28.0	532	35	27.0	-50.2	-61.6
1780	1.42	28.0	528	36	26.6	-49.9	-61.7

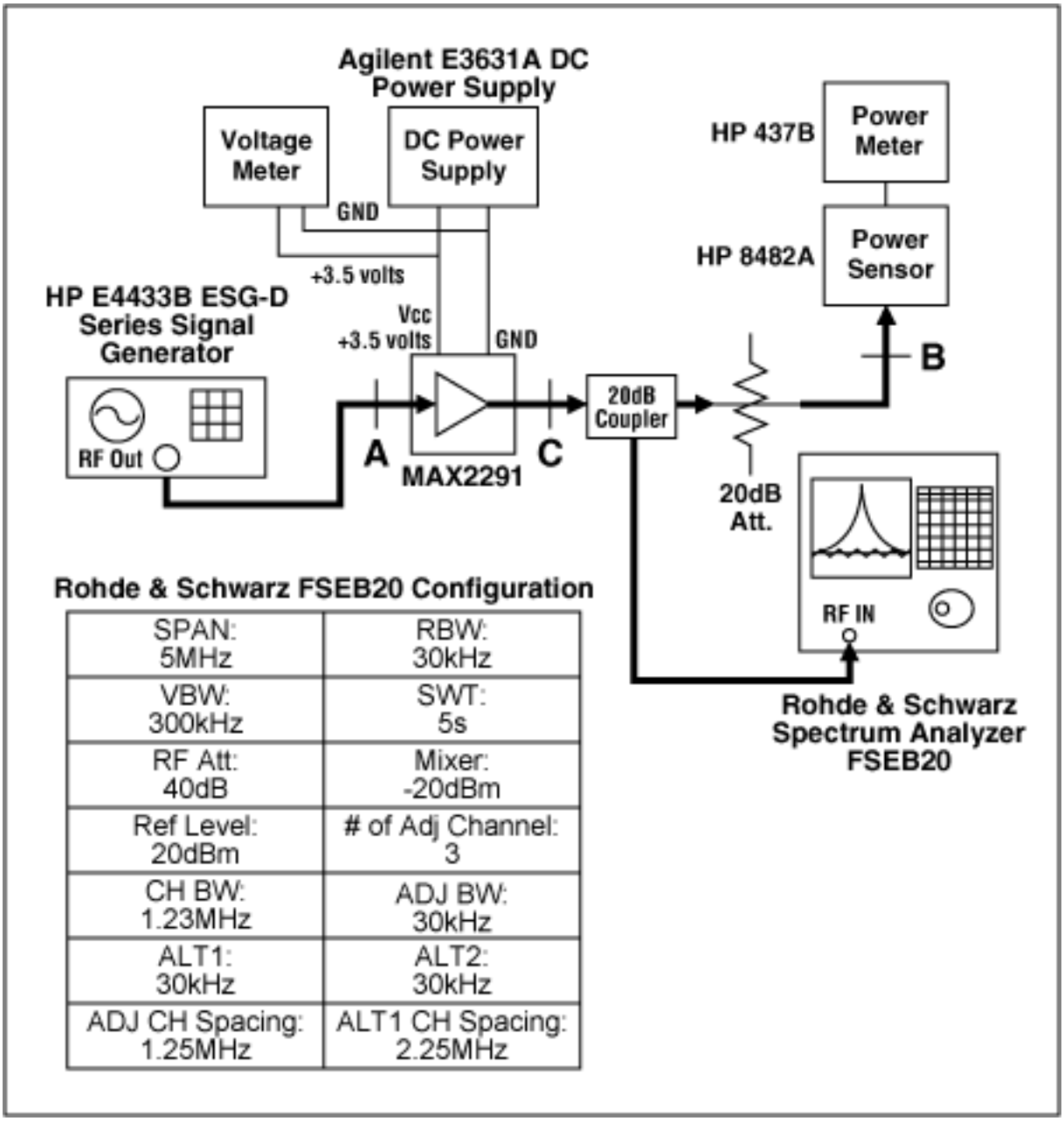
Board #1 Low-Power Mode

Frequency (GHz)	Pin (dBm)	Pout (dBm)	Icc (MA)	Eff (%)	Gain (DB)	ACPR (dBc)	ALT1 (dBc)
1750	-0.86	16.0	108	11	16.9	-48.7	-61.0
1765	-0.60	16.0	109	11	16.9	-49.3	-61.3
1780	-0.28	16.0	112	10.5	16.3	-49.6	-61.6

Bench Test Equipment List

Description	Manufacturer	Model	Note
Digital Signal Generator	Agilent	E4433B ESG-D series	
Spectrum Analyzer	Rhode and Schwarz	FSEB20	9kHz to 7GHz
Power Meter	Agilent	437B	
Power Sensor	Agilent	8482A	300mW AVG
DC Power Supply	Agilent	E3631A	0 to 6V, 5A /0 to ±25V, 1A
Digital Multi-Meter			
20dB coupler	Merrimac	CTM-20M-1.25G	
20dB attenuator	Mini-circuit	4B5W-20	5Watt

Special Test Set-Up Diagram



Rohde & Schwarz FSEB20 Configuration

SPAN: 5MHz	RBW: 30kHz
VBW: 300kHz	SWT: 5s
RF Att: 40dB	Mixer: -20dBm
Ref Level: 20dBm	# of Adj Channel: 3
CH BW: 1.23MHz	ADJ BW: 30kHz
ALT1: 30kHz	ALT2: 30kHz
ADJ CH Spacing: 1.25MHz	ALT1 CH Spacing: 2.25MHz

Bill of Materials

BOM (PDF, 11K)

Schematic

Schematic (PDF, 43K)

PC04Q401, December 2001