



Maxim > Design Support > Technical Documents > Reference Designs > Wireless and RF > APP 445

Keywords: dual-band, triple-mode CDMA, CDMA, cellular phones, cellular band, TDMA, GSM, WCDMA, 100MHz IF, IP, IP performance, low-noise amplifier, LNA, IIP3

REFERENCE DESIGN 445 INCLUDES: ✓Tested Circuit ✓Schematic ✓BOM ✓Board Available ✓Test Data

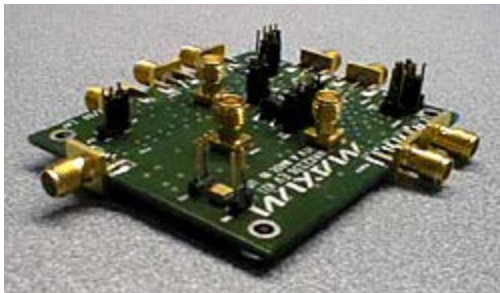
## REP010: Dual-band IS-136 FE IC at 183MHz IF

May 01, 2002

*Abstract: This reference design (RD) is for a dual-band CDMA front-end in an IS-136 TDMA receiver with all 183MHz IFs. The RD uses the MAX2338, a low-noise amplifier (LNA) with mixer that is useful for TDMA, GSM, EDGE, and WCDMA applications.*

More Information  
- [Wireless Home](#)  
- [Application Notes and Tutorials](#)  
- [EV Kit Software](#)  
- [Technical Support](#)

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.



[Click here for an overview of the wireless components used in a typical radio transceiver.](#)

*Objective: To apply and measure this dual-band triple-mode CDMA front-end IC in an IS-136 TDMA receiver with all 183MHz IFs.*

The [MAX2338](#) was made to readily facilitate a single IF for both PCS- and cellular-band receive paths. Its mixer's IP2 performance and other related parameters offer sufficient margin for meeting 1/2 IF and other interferers in a CDMA handset. In this application, the MAX2338 was tested for and successfully applied to a TDMA handset front-end design. The common 183.6MHz IFs allow for minimizing the RF VCO and therefore the lowest parts' count and the simplest frequency plan.

The MAX2338 low-noise amplifier (LNA) plus mixer is designed for dual-band CDMA cellular-phone handsets, but it can also be used in dual-band TDMA, GSM, EDGE, or WCDMA applications. The MAX2338 furnishes a divide-by-2 function in the PCS-band LO input path, providing for a single VCO at the PCS band. The buffered LO outputs permit direct driving of the transmit-path upconverter without an external LO buffer. The MAX2338 differs from its predecessors (the [MAX2320](#) and the [MAX2323](#)) in its lower noise figure and its higher IIP3 for both LNAs and mixers. Also, it comes in a small package (28-QFN).

[Schematic of the MAX2338 evaluation kit](#) (PDF, 57kB)  
[Bill of materials, part 1](#)

Bill of materials, part 2  
Measured performance of the MAX2338  
PCS mixer gain and IIP3 measurement setup  
Cellular mixer gain and IIP3 measurement setup  
FM mixer gain and IIP3 measurement setup  
PCS LNA IIP3 measurement setup  
Cellular LNA IIP3 measurement setup  
Cellular LNA noise-figure measurement setup  
PCS LNA noise-figure measurement setup  
Cellular mixer noise-figure measurement setup  
FM mixer noise-figure measurement setup  
PCS mixer noise-figure measurement setup

#### Related Parts

MAX2338	Triple/Dual-Mode CDMA LNA/Mixers
---------	----------------------------------

---

#### 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 445: <http://www.maximintegrated.com/an445>

REFERENCE DESIGN 445, AN445, AN 445, APP445, Appnote445, Appnote 445

Copyright © by Maxim Integrated Products

Additional Legal Notices: <http://www.maximintegrated.com/legal>