

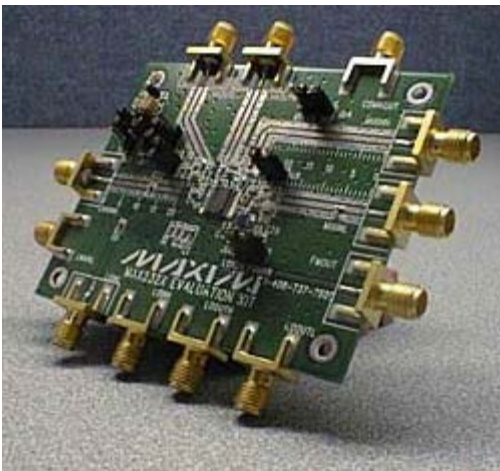
## APPLICATION NOTE 442

# REP002: Dual-Band IS-136 TDMA RF Front-End Needs no Special Components

*Abstract: Reference design (RD) is for a dual-band IS-136 TDMA RF front-end. Data show that the MAX2321 dual-band low-noise amplifier (LNA) and mixer IC exceeds IS-136 specifications and needs no additional or special components as a front-end for a TDMA application.*

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.



*Objective: To develop and proof the performance of this CDMA dual-band triple-mode front-end IC in a TDMA application, verifying its performance using no additional or special components.*

The [MAX2321](#) was developed initially for the burgeoning IS-95 CDMA market, and soon it was discovered to provide excellent performance in TDMA IS-136 as well. This application was done to demonstrate IS-136 performance. It was concluded that the target specifications were exceeded in all areas. Several measurement pages from the report are provided.

This project showed the improvements between a newer revision and its predecessor revision in the cellular and PCS mixers' NF, gain, and IIP3.

The MAX2321 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. It offers two LNA gain states to meet the required CDMA dynamic range, with a switchover hysteresis margin. There are three mixers: one for the analog cellular path and two for the digital modulation paths at cellular and PCS bands. The digital path mixers have a common IF output, as they can provide sufficient spurious and image rejection with a single IF. This capability eliminates one IF filter. The MAX2321 has separate cellular-band and PCS-band buffered VCO inputs and outputs, eliminating the need for extra transmit upconverter VCO buffers. The cell-band VCO input provides an optional X2 multiplier to permit dual-band operation from a single VCO.

[Application circuit of MAX2321](#) (PDF, 52kB)

[Schematic of MAX2321 evaluation kit](#) (PDF, 41kB)

[PCS mixer IIP3 and gain measurement](#)

[PCS mixer noise figure](#)

Cellular mixer IIP3 and gain measurement  
PCS LNA noise figure

---

#### Related Parts

[MAX2321](#) Adjustable, High-Linearity, SiGe, Dual-Band, LNA/Mixer ICs -- [Free Samples](#)

---

#### Automatic Updates

Would you like to be automatically notified when new application notes are published in your areas of interest? [Sign up for EE-Mail™](#).

---

Application note 442: [www.maxim-ic.com/an442](http://www.maxim-ic.com/an442)

More information

For technical support: [www.maxim-ic.com/support](http://www.maxim-ic.com/support)

For samples: [www.maxim-ic.com/samples](http://www.maxim-ic.com/samples)

Other questions and comments: [www.maxim-ic.com/contact](http://www.maxim-ic.com/contact)

---

AN442, AN 442, APP442, Appnote442, Appnote 442

Copyright © by Maxim Integrated Products

Additional legal notices: [www.maxim-ic.com/legal](http://www.maxim-ic.com/legal)