Keywords: TDMA, IS-136, IS-136 TDMA, CDMA, cellular band, PCS mixer, PCS bands, IF mixer, IIP3, low-noise amplifier, LNA, GSM, EDGA, WCDMA

REFERENCE DESIGN 442 INCLUDES: √ Tested Circuit √ Schematic √ Board Available √ Test Data

REP002: Dual-Band IS-136 TDMA RF Front-End

Needs no Special Components

Nov 01, 2000

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.

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 |

### More Information
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Application Note 442: [http://www.maximintegrated.com/an442](http://www.maximintegrated.com/an442)
REFERENCE DESIGN 442, AN442, AN 442, APP442, Appnote442, Appnote 442
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