Keywords: MAX2170, MAX2171, DAB/T-DMB

REFERENCE DESIGN 4154 INCLUDES: √Tested Circuit √Board Available √Description √Test Data

MAX2170/MAX2171 DAB/T-DMB Reference Design

Dec 20, 2007

Abstract: The MAX2170/MAX2171 tuner plus demodulator IC reference design demonstrates a compact daughter board solution for DAB and T-DMB. The design converts VHF-III and L-Band signals to a MPEG-2 transport stream.

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

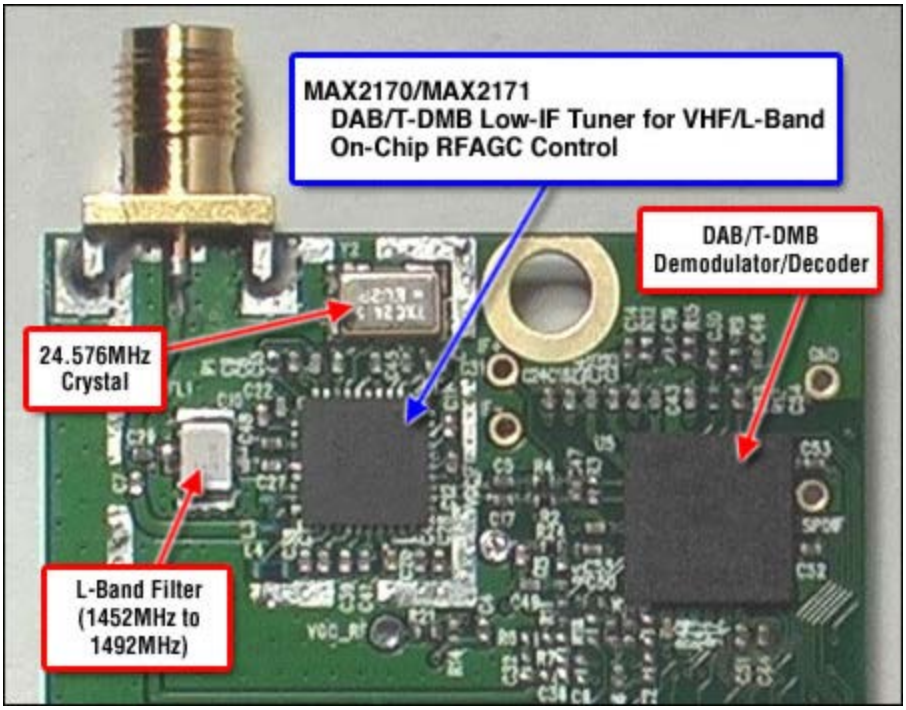

Figure 1. The MAX2170/MAX2171 tuner plus demodulator reference design.

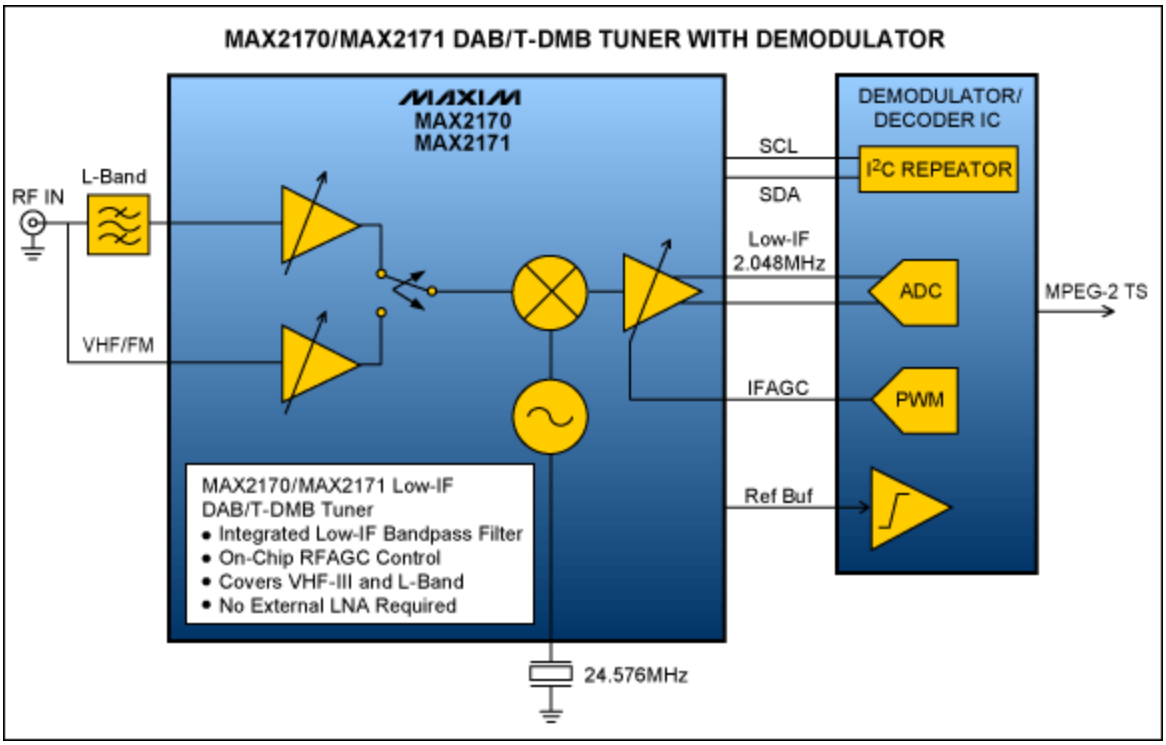

Figure 2. System Block Diagram

Lab Measurements

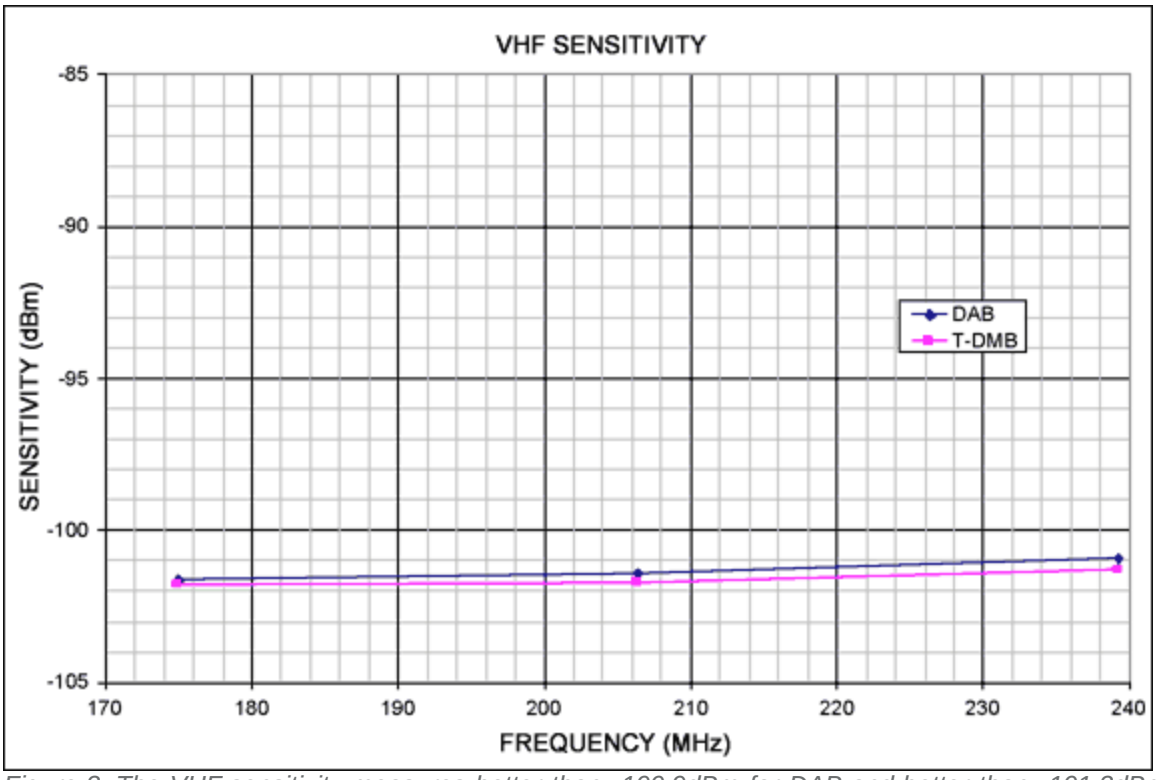

Figure 3. The VHF sensitivity measures better than -100.9dBm for DAB and better than -101.3dBm for T-DMB.

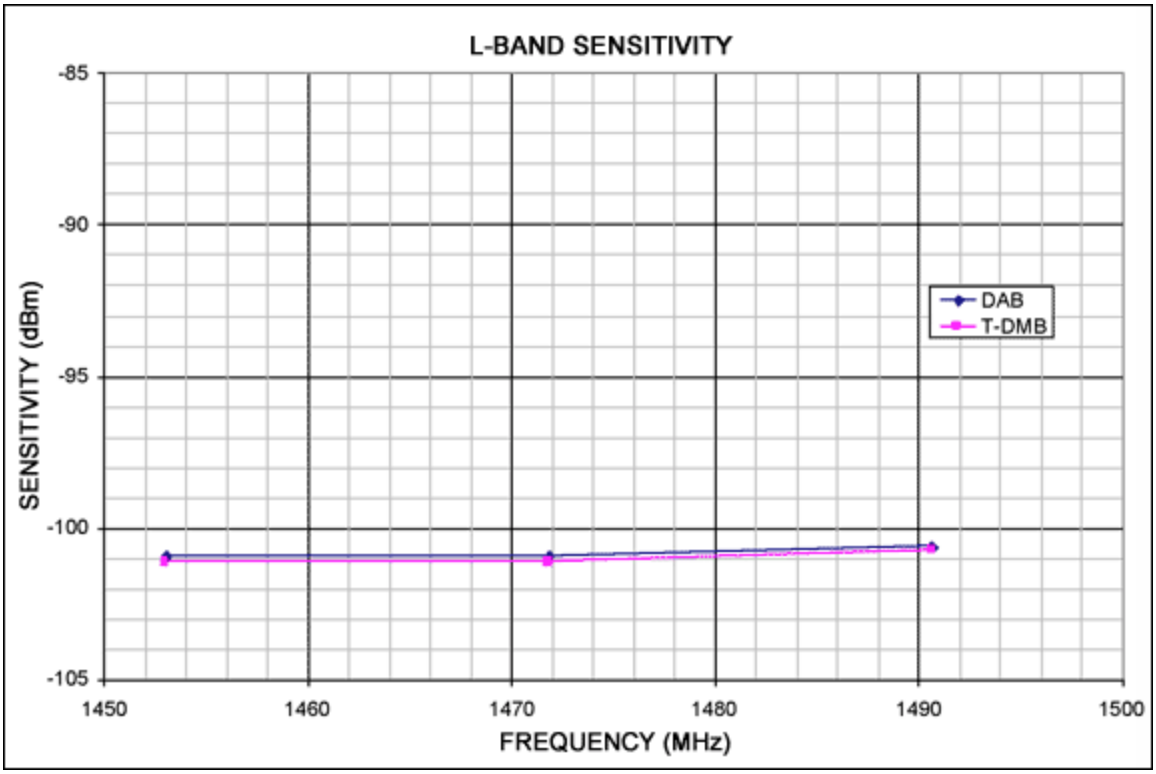

Figure 4. The L-Band sensitivity measures better than -100.6dBm for DAB and better than -100.7dBm for T-DMB.

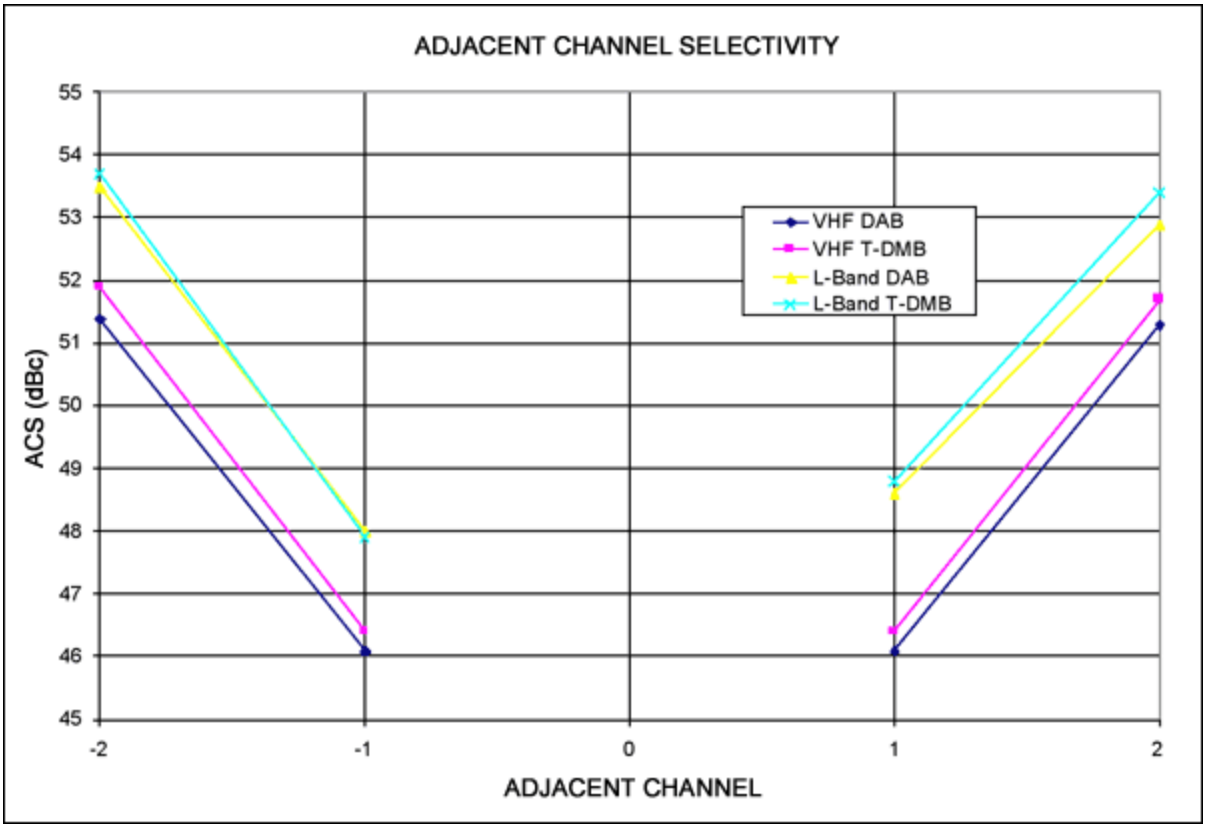

Figure 5. The Adjacent Channel Selectivity (ACS) is better than 46dBc at the N±1 adjacents for VHF, and improves by almost 2dB for L-band. With these ACS measurements, the desired signal is at -70dBm and 206.352MHz for VHF and 1471.792MHz for L-band. The channel spacing is 1.712MHz.

Additional Measurements

The maximum input level is 10dBm for DAB and T-DMB in both VHF and L-band. This input level is limited by the absolute maximum rating of the MAX2170/MAX2171 devices.

DAB

Parameter	Conditions	Measured	Units
Maximum Input	VHF: 174.928, 206.352, 239.200MHz	10, 10, 10	dBm
	L-Band: 1452.960, 1471.792, 1490.624MHz	10, 10, 10	
Far-Off Selectivity, VHF (Desired: -70dBm, 206.352MHz)	N+5MHz FM Adj	66.7	dBc
	N-5MHz FM Adj	66.6	
Far-Off Selectivity, L-Band (Desired: -70dBm, 1471.792MHz)	N+5MHz FM Adj	67.0	dBc
	N-5MHz FM Adj	66.9	

T-DMB

Parameter	Conditions	Measured	Units
Maximum Input	VHF: 174.928, 206.352, 239.200MHz	10, 10, 10	dBm

	L-Band: 1452.960, 1471.792, 1490.624MHz	10, 10, 10	
Far-Off Selectivity, VHF (Desired: -70dBm, 206.352MHz)	N+5MHz FM Adj	66.2	dBc
	N-5MHz FM Adj	66.9	
Far-Off Selectivity, L-Band (Desired: -70dBm, 1471.792MHz)	N+5MHz FM Adj	67.0	dBc
	N-5MHz FM Adj	66.9	

DAB/T-DMB Frequency Plan

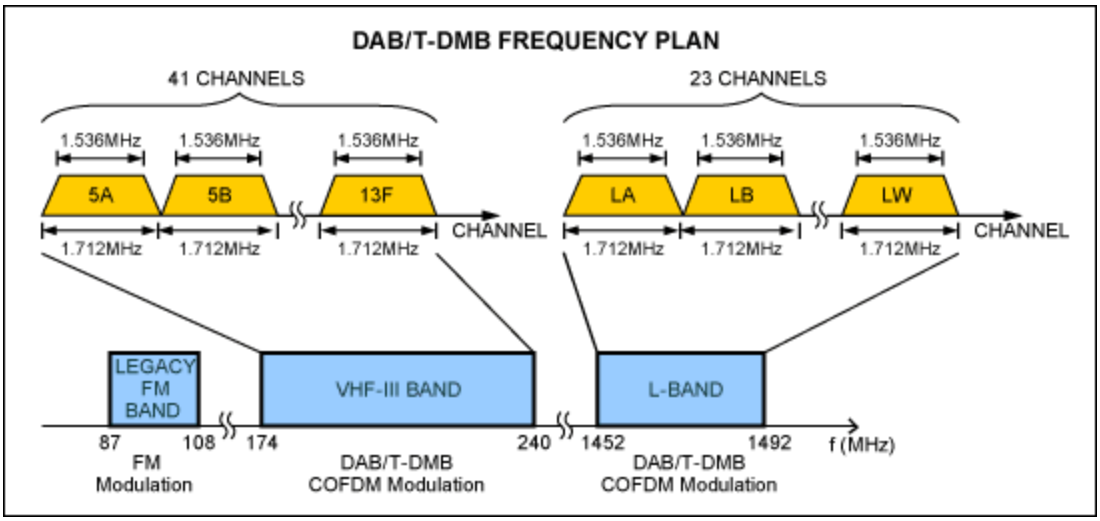

Figure 6. The DAB/T-DMB RF signal is typically broadcast in the VHF-III band and L-band. The channel spacing is typically 1.712MHz with 1.536MHz signal bandwidth.

Detailed Description

The MAX2170/MAX2171 low-IF tuner is designed for Digital Audio Broadcast (DAB) and Terrestrial Digital Multimedia Broadcast (T-DMB) applications, covering an input frequency range of 168MHz to 240MHz (VHF-III) and 1452MHz to 1492MHz (L-band). The MAX2170/MAX2171 achieve a high level of component integration, thus allowing low-power, tuner-on-board designs. The low-IF architecture eliminates the need for an IF-SAW filter, while providing a balanced 2.048MHz center frequency baseband output to the demodulator. The MAX2170 provides a buffered reference clock at the crystal frequency, while the MAX2171 outputs a reference at 1/3rd of the crystal frequency. A sigma-delta fractional-N synthesizer is incorporated to optimize both close-in and wideband phase-noise performances for OFDM applications where sensitivity to both 1kHz phase noise and wideband phase noise related to strong adjacents can be a problem.

Related Parts	
MAX2170	Direct-Conversion to Low-IF Tuners for Digital Audio Broadcast

MAX2171	Direct-Conversion to Low-IF Tuners for Digital Audio Broadcast	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 4154: http://www.maximintegrated.com/an4154
REFERENCE DESIGN 4154, AN4154, AN 4154, APP4154, Appnote4154, Appnote 4154