

Application Brief

The Future of Fixed Wireless Access



Megi Shahollari

In an era with increasing demand for high-speed internet connectivity in both residential and commercial applications, Fixed Wireless Access (FWA) emerges as a compelling alternative to traditional, wired broadband solutions. FWA leverages wireless technology to provide cost-effective internet solutions to fixed locations, such as homes, businesses, and remote areas. Common frequency bands associated with FWA include 2.4GHz and 5GHz, which are used worldwide. Major telecommunication companies invest heavily in FWA to improve coverage across diverse regions, diving into opportunities to serve both densely populated and remote locations.

As highlighted in [FWA is boosting RAN — Industry Voices: Pongratz](#), major telecommunication companies actively explore opportunities to improve broadband access in Europe, the Middle East, and Africa (EMEA). These efforts are particularly noticeable in Saudi Arabia, where FWA is projected to reach 23 million subscribers by 2027, covering 75% of the population. On a global scale, Radio Access Network (RAN) analysts predict that the number of FWA users will grow from 60 million to 200 million by 2025, underscoring the increasing demand for wireless solutions and, consequently, reliable internet connectivity.

The potential of FWA to bridge connectivity gaps is significant - according to reports by [FWA is boosting RAN — Industry Voices: Pongratz](#), approximately 40% of the two billion households worldwide still lack a broadband connection. In the U.S., a major mobile company highlights that 50% to 60% of households are in areas with limited broadband options, positioning FWA as a viable solution to enhance connectivity. As the market evolves, continued investment and innovation in FWA technology is essential to meet the growing demand for high-speed, reliable internet access to bridge the digital divide.

As FWA continues to grow, advanced RF transceiver technologies play a crucial role in addressing the challenges of signal integrity, range, and data rates. Texas Instruments has multiple devices for FWA, depending on the application scenarios. The first family of device is AFE77xxD. The AFE7769D has integrated Digital Pre-Distortion (DPD), which leads to savings in system cost and power.

The AFE77xxD RF transceiver is an acceptable solution for integration within FWA networks due to its advanced technical capabilities. Key features include:

- **RF frequency range:** 600MHz to 6GHz, covers most common frequency bands for FWA.
- **Integrated Digital Pre-Distortion (DPD):** Provides for efficient signal transmission by correcting nonlinearities in the power amplifier.
- **Integrated Crest Factor Reduction (CFR):** Enhances Power Amplifier (PA) linearization, contributing to a cleaner signal output.
- **Multi-channel capability:** Supports four transmit and four receive channels, allow for dual and triple-band flexibility within one transceiver, enabling complex multi-antenna systems.
- **Direct RF sampling:** Simplifies the system calibration.

The AFE77xxD integrated DPD algorithm provides for a cleaner signal and reduces interference from out-of-band spectrum growth due to PA nonlinearity, extending the range and reliability of FWA connections. The quad-channel device simplifies the deployment of multi-antenna systems, which is critical for achieving broader coverage and higher transmission rates.

In addition, the low power consumption of the AFE77xxD is designed for remote or off-grid locations which can have limited power resources.

The AFE79xx family of devices is a viable solution, which is for regions looking to expand to use 6GHz+ radio frequency and 400MHz+ bandwidth. The AFE7952 RF transceiver from AFE79xx family supports up to 12GHz of frequency and 2.4GHz of instantaneous bandwidth.

The Texas Instruments AFE transceiver portfolio, including AFE77xxD, AFE79xx, and AFE7952, offer a comprehensive set of solutions tailored for the diverse requirements of FWA networks. From enhancing signal quality and reducing interference to supporting high-speed data rates and efficient power consumption, these transceivers are equipped to handle the evolving demands of modern wireless connectivity. By leveraging these advanced technologies, internet service providers deliver robust, reliable, and scalable FWA services to meet the growing demand for high-speed internet access in urban and remote areas.

References

- Texas Instruments, [RF-sampling transceivers](#)
- Fierce Network, [FWA projected to grow dramatically, but it still has problems](#)
- Fierce Network, [FWA is boosting RAN — Industry Voices: Pongratz](#)

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2024, Texas Instruments Incorporated