UMTS/HSPA/GSM/GPRS/EDGE RF Transceiver LSI for Multimode/Multiband Communication

MB86L01A

We have developed RF transceiver LSI “MB86L01A,” which supports the GSM, GPRS, and EDGE communication methods for second-generation cell phones and the UMTS and HSPA communication methods for third-generation cell phones. It mounts a 3G DigRF interface on 1 chip.

By adopting a low-noise circuit utilizing our rich digital circuit technology as a built-in circuit, it no longer requires the external parts which had previously been necessary, leading to a reduction in the number of external parts and contributing to cell phone thickness reduction and miniaturization.

Introduction

The demand for international roaming that allows the use of cell phones purchased in Japan while abroad is high in the current cell phone market, and the need to address various communication methods and frequencies (multimode/multiband communication) in different countries and regions is growing rapidly. Concurrently, there is a trend toward cell phone thickness reduction and miniaturization as well as shorter product development cycles—in this context, the burden on cell phone manufacturers continues to grow.

FUJITSU has developed “MB86L01A,” a product capable of satisfying the demands of cell phone manufacturers. It has now entered the RF transceiver LSI market.
Overview

This product supports the GSM, GPRS, and EDGE communication methods used in second-generation cell phones adopted in many regions of the world and all of their frequencies. It is also capable of supporting the UMTS and HSPA communication methods for third-generation cell phones and simultaneously using up to 4 of the 10 frequency bands for these methods.

This product has a low-noise circuit in a small package of LGA-142 pins (7.1mm×5.9mm). This eliminates the need for external attachment of the conventional SAW filter and LNA and enables space saving in the RF block, leading to cell phone thickness reduction and miniaturization.

Whereas circuit configuration using the analog technique was the mainstream in conventional RF transceiver LSI products, this product introduces various digital circuit techniques. It is equipped with an output interface to support digital signals for controlling external parts such as the antenna switch and power amplifier and can simplify the system. In addition, adjustment of the in-system RF control method, filtering, and so forth can be conducted simply, thus reducing the cost of development, testing, verification, and so forth by programming the signal control information in the built-in CPU of this product.

This product also has a built-in interface conforming to 3G DigRF*1 specification. It is an RF transceiver LSI that is compatible in connection to baseband LSIs conforming to this specification.

Product Features

- **Space saving achieved with a SAW filter and the elimination of LNA**

The conventional circuit configuration of the RF block required an external SAW filter to reduce the noise output between the RF LSI transmission block and the power amplifier. However, this product is capable of low-noise output with our proprietary transmission circuit configuration and thus requires no SAW filter for transmission in UMTS communication. Furthermore, the SAW filter which had conventionally been externally attached to the RF LSI reception input block to suppress deterioration of the radio wave reception sensitivity is not required for the reception system in UMTS and GSM communication thanks to our proprietary reception circuit configuration. This product has built-in LNA in all reception system circuits. This enables up to 20 fewer parts compared to existing products, leading

![Skeleton Framework for MB86L01A](image-url)
to simplified design in the RF system block and a more than 10% reduction in the area occupying the RF block compared to conventional products (our conventional products).

- **New programming method reduces the development load**
  The built-in CPU in this product can operate programs and control various internal functions. It is possible to execute processes that vary depending on the system configuration of the cell phone, tuning of the digital filter, and so forth. The time required in cell phone system development, verification, and so forth can thus be reduced through program control instead of hardware change.

- **UMTS/HSPA and GSM/GPRS/EDGE communication methods supported on 1 chip**
  This product supports the 4 frequency bands GSM850, EGSM900, DCS1800, and PCS1900 for the second-generation communication methods GSM, GPRS, and EDGE. It is also capable of simultaneously using up to 4 bands of the bandwidths I, II, III, IV, V, VI, VII, IX, X, and XI for the third-generation communication methods UMTS and HSPA. It supports the maximum download speed for high-speed data communication HSDPA*2 of 14.4Mbps and the maximum upload speed HSUPA*3 of 5.7Mbps.

- **Supports the global standard DigRF interface**
  This product is an RF transceiver LSI that is compatible in connection to basebands with built-in interface with DigRF Ver3.09 (an interface specification between baseband LSI and RF LSI).

  Figure 1 presents the skeleton framework for this product.

**Future Developments**

Succeeding this product, FUJITSU continues to develop RF transceiver LSIs that support high bit rates to be utilized in next-generation communication methods. In the future, we will continue to provide leading-edge RF solutions along with other semiconductor products such as power management ICs. *

**NOTES**

*1: 3G DigRF: Interface specification between baseband and RF developed by the MIPI Alliance.

*2: HSDPA: Abbreviation for High-Speed Downlink Packet Access. A specification with speedup in download data communication in the third-generation (3G) cell phone method W-CDMA.

*3: HSUPA: Abbreviation for High-Speed Uplink Packet Access. A specification with speedup in upload data communication in the third-generation (3G) cell phone method W-CDMA.