CDMA Products Data Book

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RFR3100™

RF to IF Receive Processor

RFR3100

Overview

The RFR3100 RF-to-IF Receive device performs all of the front-end receive (Rx) signal processing required between the antenna and the Qualcomm IFR3000™ IF-to-Baseband Processor for IS-95 CDMA Cellular and PCS singleband and dualband applications. The RFR3100 device integrates dualband Low Noise Amplifiers (LNAs) and mixers for downconversion from RF to CDMA and FM IF, and together with the IFR3000 device comprise a complete RF-to-Baseband chipset solution for the Rx path. The RFR3100 device offers the most advanced and integrated CDMA Rx solution designed to meet cascaded Noise Figure (NF) and Third-order Intercept Point (IIP3) requirements of IS-98 and JSTD-018 specifications for Sensitivity, Two-tone Intermodulation, and Single-tone Desense.

Gain control for the RFR3100 device's Cellular LNA is provided for improved dynamic range and Rx performance in the presence of high level interfering signals. Operating modes and band selection are specially controlled from the MSM3100™ device. Figure 1 shows the interface between the MSM3100 and RFR3100 devices.
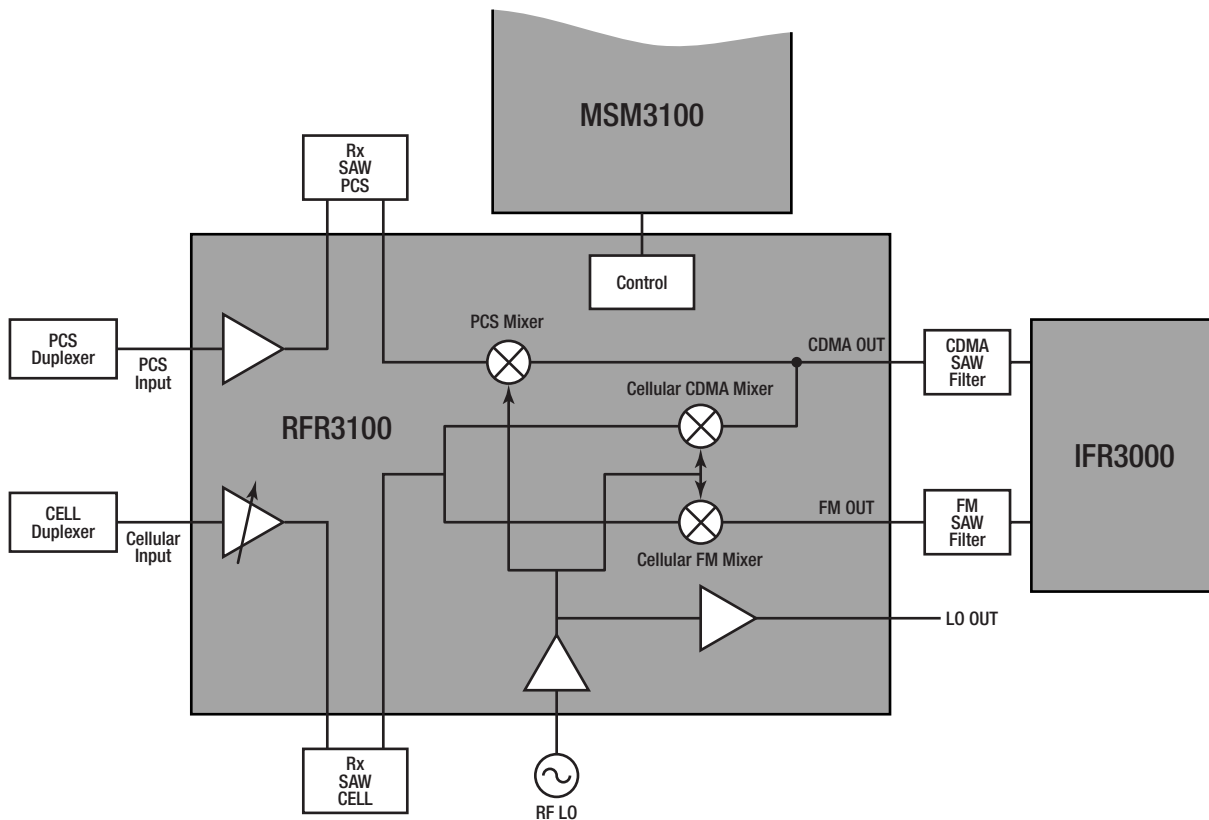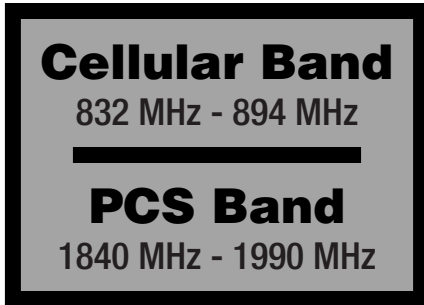

Figure 1. RFR3100 Device Functional Block Diagram

Designed to meet the requirements for global CDMA markets, the RFR3100 device will operate over the following frequency ranges:

Cellular Band
832 MHz - 894 MHz

PCS Band
1840 MHz - 1990 MHz

Range of supply voltage is from 2.7V to 3.3V which provides operating compatibility for platforms utilizing a single-cell Li-Ion battery design. Enhanced features controlled from the MSM3100 device, including selective power-down modes, allow optimized power savings and extended standby-time performance.

The RFR3100 device is fabricated on an advanced silicon germanium BiCMOS process which facilitates low-noise, low-power, high frequency analog circuits along with CMOS control functions, and is provided in a 32-pin BCC++ plastic package.

RFR3100 Device Features
- Performs downconversion from RF to CDMA and FM IF
- Can be used for Dualmode Cellular (CDMA/AMPS), Singleband PCS, or Dualband PCS (PCS CDMA/AMPS) Applications

- Designed to meet cascaded NF and IIP3 requirements for IS-98 and JSTD-018 specifications
- LNA Gain Control provided for improved Dynamic Range and Rx Performance in the Presence of High Level Interferers
- Selective Power-down modes for Extended Standby-time Performance
- Supply Voltage from 2.7 V to 3.3 V
- BCC++ 32-pin Plastic Package
  (5 mm x 5 mm x 0.8 mm)

Sixth Generation CDMA Chipsets

The dual-mode code-division multiple-access and advanced mobile phone system (CDMA/AMPS) cellular telephone is a complex consumer communications instrument that relies heavily upon digital signal processing. To simplify the design and reduce the production cost of the subscriber unit, QUALCOMM has developed its sixth generation Mobile Station Modem™ (MSM3100) device and system solution. The heart of the solution is QUALCOMM's MSM3100 single-chip baseband processor modem that interfaces directly with the IFR3000, RFR3100, RFT3100™, and PM1000™.

This complete CDMA chipset is the optimal solution for an IS-95 A/B or other global cdmaOne compliant handset. Along with an optimized software solution for the whole modem, system development software, verification, test, debug, calibration, manufacturing and field test support are available using the CDMA Designer™ development tools reducing time to market for a complete CDMA handset.

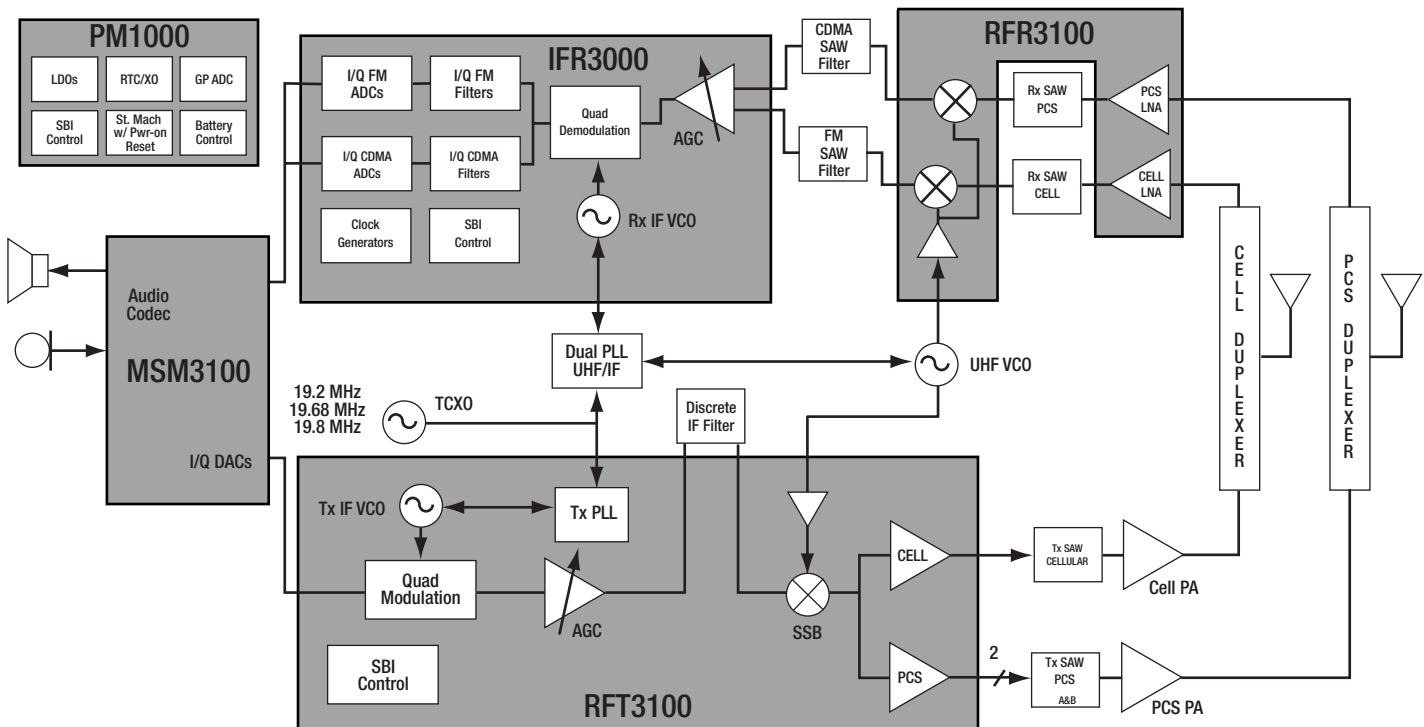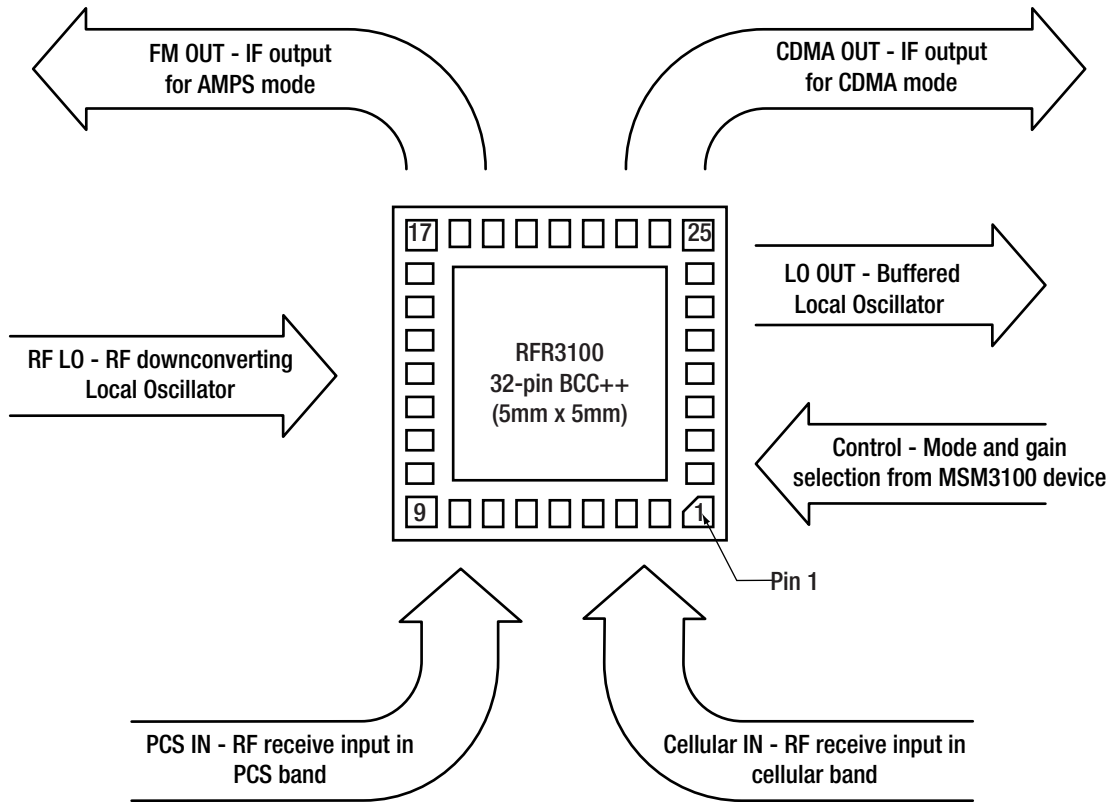Figure 2 shows the Sixth Generation System Block diagram

Figure 2. RFR3100 device as part of QUALCOMM's 6th Generation Chipset

Input/Output Signals

Figure 3 shows the Input/Output functions provided by the RFR3100 device's pins.

FM OUT - IF output for AMPS mode

CDMA OUT - IF output for CDMA mode

17 ☐☐☐☐☐☐ 25

RFR3100
32-pin BCC++
(5mm x 5mm)

9 ☐☐☐☐☐☐ 1

RF LO - RF downconverting Local Oscillator

LO OUT - Buffered Local Oscillator

Control - Mode and gain selection from MSM3100 device

Pin 1

PCS IN - RF receive input in PCS band

Cellular IN - RF receive input in cellular band

Figure 3. RFR3100 RF to IF Receive Processor Functional Diagram

Mechanical Specifications

The RFR3100 device is packaged in a 32-pin Bump Chip Carrier (BCC++)

package . Figure 4 shows the 48-pin BCC++ package outline drawing.

TOP VIEW   **SIDE VIEW**
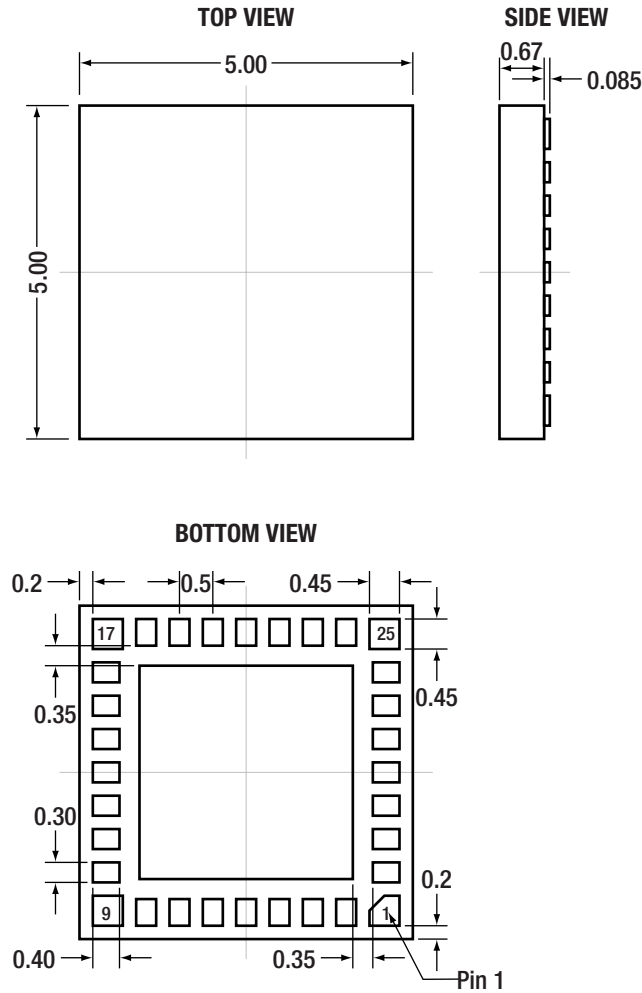
Dimensions are in mm

Figure 4. 32-pin BCC++ Package Outline Drawing

RFT3100™

Baseband to RF Transmit Processor

RFT3100

Overview

The RFT3100 Baseband-to-RF Transmit Processor performs all transmit (Tx) signal processing functions required between digital baseband and the Power Amplifier (PA) for IS-95 CDMA Cellular and PCS singleband and dualband applications.

The RFT3100 incorporates the previous generation functionality of the IFT3000™ Baseband-to-IF Processor together with the Tx processing of the Qualcomm UD3000™ IF-to-RF Transmit device all in an ultra small bump chip carrier (BCC) package. The RFT3100 device offers the most advanced and integrated CDMA Tx solution providing a board area savings of more than 65% over previous generation chipsets, along with minimized power consumption for extended talk-time performance.

The RFT3100 device connects directly with Qualcomm's MSM3100™ device utilizing an analog baseband interface which is upconverted to the Cellular or PCS frequency bands with the needed signal drive capability to the PA. The RFT3100 device includes an IF mixer for upconverting analog baseband to IF, a programmable PLL for generating Tx IF frequency, single sideband upconversion from IF to RF, two Cellular and two PCS driver amplifiers, and Tx power control through 85dB dynamic range AGC. As added benefit, the single sideband upconversion eliminates the need for a bandpass filter normally required between the upconverter and driver amplifier providing an overall board area and cost savings.   RFT3100 device operations are specially controlled from the MSM3100 device via the three-line serial bus interface (SBI). Figure 1 shows the interface between the MSM3100 and RFT3100 devices.
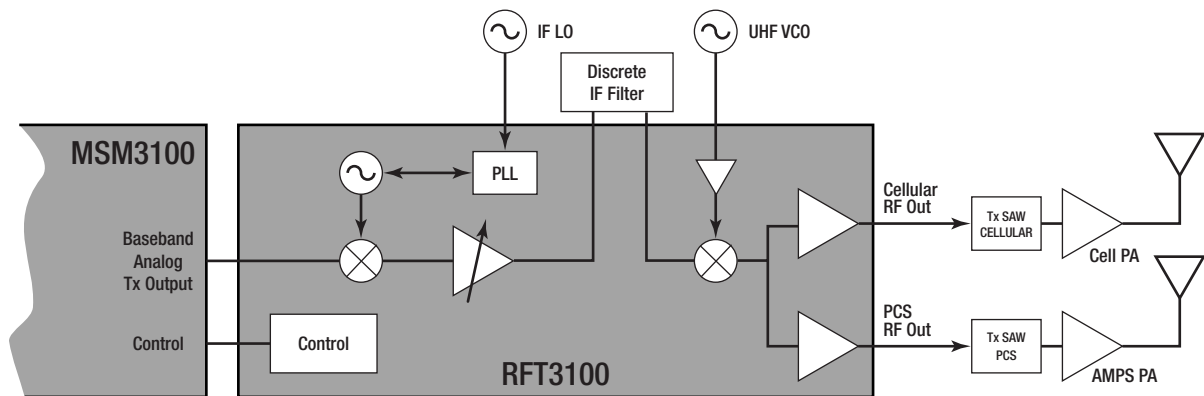

Figure 1. RFT3100 Device Functional Block Diagram

Designed to meet the requirements for global CDMA markets, the RFT3100 device will operate over the following frequency ranges:

Cellular Band
824 MHz - 925 MHz

PCS Band
1750 MHz - 1910 MHz

Range of supply voltage is from 2.7 V to 3.3 V which provides operating compatibility for platforms utilizing a single-cell Li-Ion battery design. Enhanced operating modes controlled from the MSM3100 device, including selective power-down, gain control, and punctured CDMA transmission (gated Tx power), allow optimized power savings and talk-time improvement.

The RFT3100 device is fabricated on an advanced BiCMOS process which accommodates both precision high-frequency analog circuits and low-power CMOS functions, and is provided in a
32-pin BCC++ plastic package.

RFT3100 Device Features
- Performs full upconversion from Analog Baseband to RF Tx
- Integrated I/Q Modulator, IF VCO/PLL, SSB Upconversion, AGC, and Driver Amplifiers
- Can be used for Dualmode Cellular (CDMA/AMPS), Singleband PCS, or Dualband PCS (PCS CDMA/AMPS) Applications

- Eliminates Image-reject Filter between Upconverter and Driver Amplifier
- Includes two Cellular and two PCS Driver Amplifier Outputs
- Operation controlled by the MSM3100 device via Serial Bus Interface (SBI)
- Tx Power Control through 85 dB dynamic range AGC
- Puncture mode (gated Tx power) for extended Talk-time Performance
- Supply Voltage from 2.7 V to 3.3 V
- BCC++ 32-pin Plastic Package
  (5 mm x 5 mm x 0.8 mm)

Sixth Generation CDMA Chipsets
The dual-mode code-division multiple-access and advanced mobile phone system (CDMA/AMPS) cellular telephone is a complex consumer communications instrument that relies heavily upon digital signal processing. To simplify the design and reduce the production cost of the subscriber unit, QUALCOMM has developed its sixth generation Mobile Station Modem™ (MSM3100) device and system solution. The heart of the solution is QUALCOMM's MSM3100 single-chip baseband processor modem that interfaces directly with the IFR3000™, RFR3100™, RFT3100, and PM1000™ devices.

This complete CDMA chipset is the optimal solution for an IS-95 A/B or other global cdmaOne compliant handset. Along with an optimized software solution for the whole modem, system development software, verification, test, debug, calibration, manufacturing and field test support are available using the CDMA Designer™ development tools reducing time to market for a complete CDMA handset.

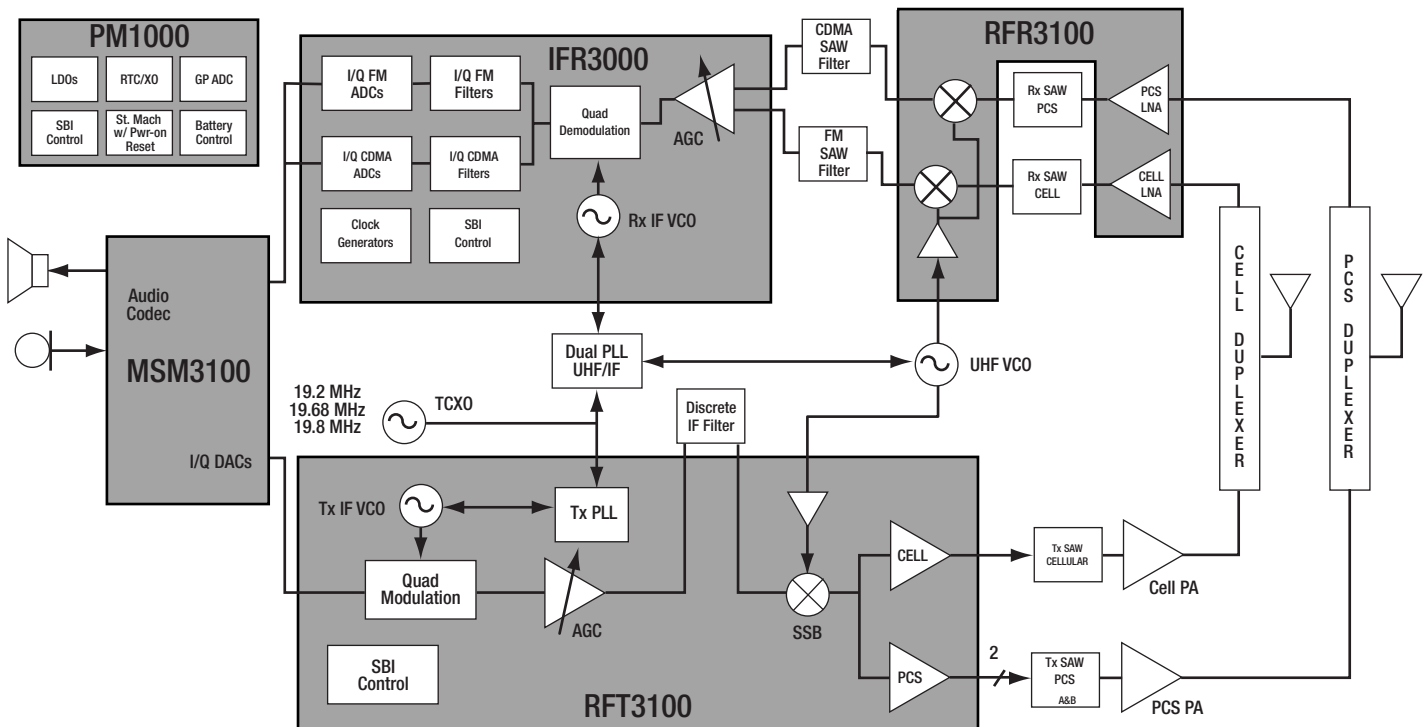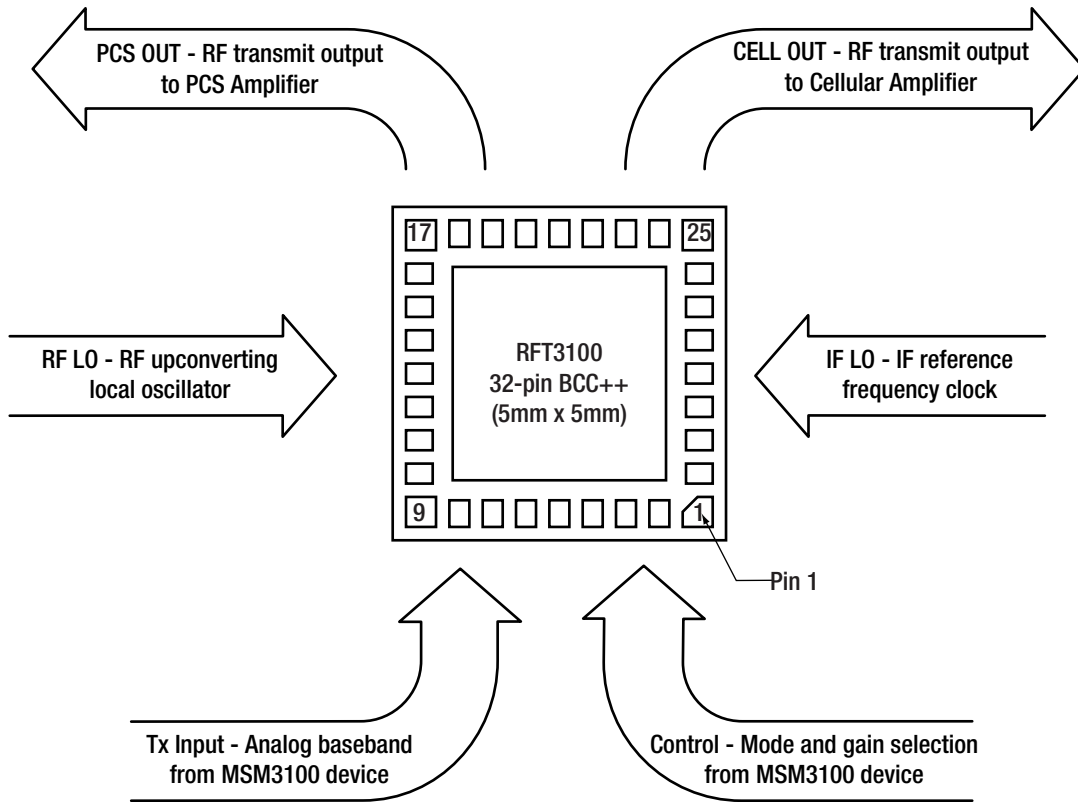Figure 2 shows the Sixth Generation System Block diagram

Figure 2. RFT3100 device as part of QUALCOMM's 6th Generation Chipset

Input/Output Signals

Figure 3 shows the Input/Output functions provided by the RFT3100 device's pins.

PCS OUT - RF transmit output to PCS Amplifier

CELL OUT - RF transmit output to Cellular Amplifier

RF LO - RF upconverting local oscillator

RFT3100
32-pin BCC++
(5mm x 5mm)

IF LO - IF reference frequency clock

Pin 1

Tx Input - Analog baseband from MSM3100 device

Control - Mode and gain selection from MSM3100 device

Figure 3. RFT3100 Baseband-to-RF Transmit Processor Functional Diagram

Mechanical Specifications

The RFT3100 is packaged in a 32-pin Bump Chip Carrier (BCC++) package .

Figure 4 shows the 48-pin BCC++ package outline drawing.

TOP VIEW   **SIDE VIEW**

BOTTOM VIEW

Dimensions are in mm

Figure 4. 32-pin BCC++ Package Outline Drawing