

## X-GOLD™ SDR 20

### Programmable Baseband Processor for Multi-Standard Cell Phones

TO ADDRESS the “multi-standard challenge” where an increasing number of cellular, connectivity, broadcast, and multimedia standards co-exist in a mobile phone, Infineon is now offering its innovative **software-defined-radio (SDR) technology**. Its key attraction is the ability to support multiple standards on the same processor by changing the software only. This concept has enormous benefits for multi-standard wireless applications, such as reduced cost-of-ownership, faster time-to-market, unprecedented flexibility, and smaller form factors when compared with classical baseband solutions.

The introduction of X-GOLD™ SDR 20 signals the commercialisation of Infineon’s SDR technology for mobile applications. This market entry occurs after intensive research and development work with the objective to provide highest flexibility and simplest programmability at competitive silicon area and power consumption. The success of this effort is evident in X-GOLD™ SDR 20 which is ready to meet the stringent cost and power requirements of portable devices. Furthermore, by leveraging its complete portfolio of wireless hardware and software components, coupled with its strong system competence, Infineon is now able to offer complete mobile platforms based on disruptive SDR technology.

X-GOLD™ SDR 20 contains a power management unit which uses advanced power control measures to achieve minimal idle power in stand-by and minimal active power in each operating mode and use case. In addition, the PMU is able to supply the RF transceiver.

X-GOLD™ SDR 20 matches optimally with the RF transceiver SMARTi®-SR2 which supports both cellular and satellite standards. Together with the unified protocol stack for cellular and satellite communication they form the main constituents of the SDR mobile platform XMM™ SDR 200.



#### Key Features

- Innovative Multi-DSP centred and accelerator-assisted architecture
- ARM®1176JZ for protocol stack processing
- Integrated voice codecs
- Dig-RF interface V3.09 to RF transceiver
- SPI interface to application processor
- Integrated PMU with SW-controlled advanced power saving measures
- 65 nm CMOS technology
- SW/FW packages for
  - GSM, GPRS, EDGE (Classes 1-12 and 30-33)
  - WCDMA (3GPP Rel. 6)
  - HSDPA cat.8 (diversity), HSUPA cat. 2
  - LTE (4 x 2 MIMO, 2 data streams, 5 MHz bandwidth)
  - GMR-3G for satellite communication (TX/RX diversity)
- Upgradeable by SW to
  - Wifi 802.11a/b/g/n
  - Mobile TV standards (DVB-H/SH, etc.)

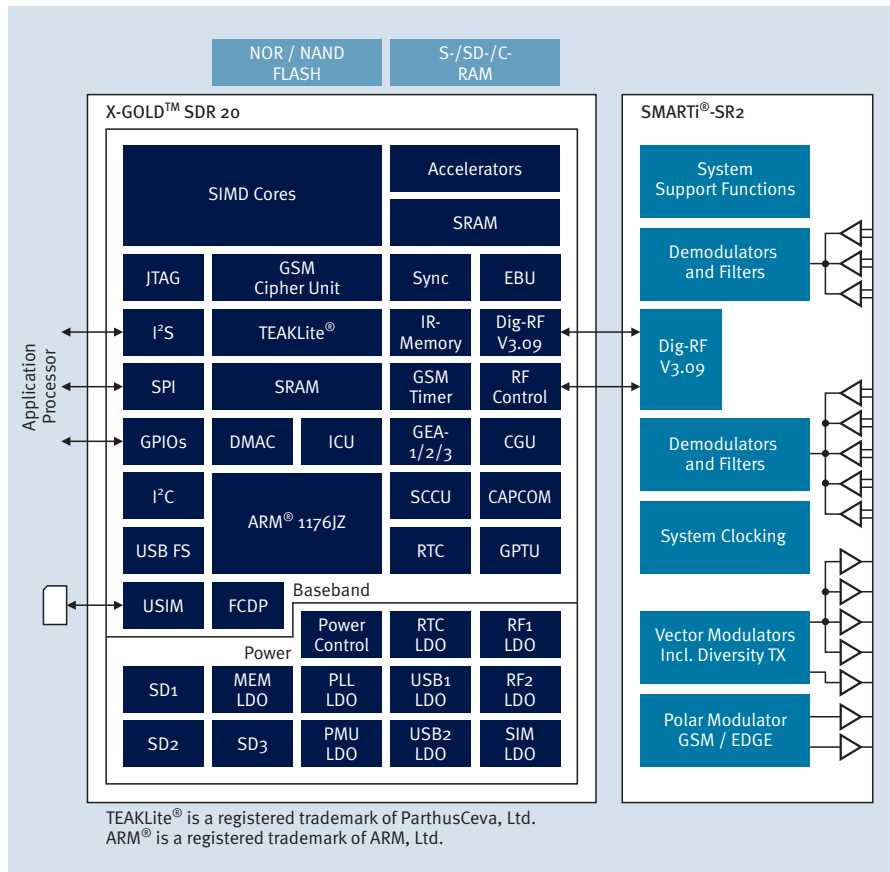
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## Communication Solutions



Never stop thinking

## XMM™ SDR 200 modem solution comprising X-GOLD™ SDR 20 and RF chip SMARTi®-SR2



## Key Benefits

- **Lowered total cost-of-ownership**  
SDR baseband solutions take advantage of the fact that not all the standards implemented in a handset need to run in parallel. This allows for a lean implementation where processing resources are shared between the different standards and results in a more cost efficient solution at competitive power consumption compared to conventional baseband technology. Equally important, the number of components is reduced, not only lowering the PCB size, but also simplifying the system design and complexity, as well as easing supply-chain management and inventory.

- **Favourable economies-of-scale**  
The programmable nature of SDR allows OEMs to re-use the same hardware across multiple product segments, thus improving economies-of-scale. Handsets defined to work with specific wireless standards, e.g. in dedicated geographic regions, and/or with selected connectivity features, can all be based on the same hardware

- **New product releases via SW upgrades**  
The lifetime of X-GOLD™ SDR 20-based wireless products can be greatly increased as feature enhancements can be realized through SW upgrades. Different set-ups of use cases will be able to run on the same hardware. Hence, new product releases can be brought up swiftly.

- **Reduced R&D efforts and shorter time-to-market**

X-GOLD™ SDR 20 architecture is scalable and enables unprecedented reuse of both hardware and software, significantly shortening development cycles, especially when working with evolving standards.

## Programming Model

C code for the supported standards is partitioned into threads and mapped onto the SIMD cores such that the computational load is balanced and the communication bandwidth between SIMD cores becomes minimal, given the constraints of limited bus bandwidth between processors and memories. The quasi static scheduling of threads and the communication via shared memory to the ARM protocol processor is supported by a lightweight RTOS. Thread code comes in two flavours, scalar and vector-valued, the latter one being implemented in assembler to keep power consumption within competitive limits. Typically, writing assembler is less than 8% of the time needed to create and test the C program of a standard.

## Development Tools

In cooperation with our customers Infineon provides complete, IOT-tested reference designs for mobile platforms. The software package includes the L1 software, implemented on the SDR core, the L2/L3 protocol stack, low-level drivers, RTOS, and application layer. A number of SW development tools are available to analyse, design, compile, debug, and test the L1 software running on the SDR core. Furthermore, for early SW development, a cycle- and bit-accurate virtual prototype is available.

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## Information

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## Warnings

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