ARTIK 10 User Manual

FCC ID: A3LATKM102000

IC: 649E-ATKM102000

Model: ATKM102000

1. ARTIK 10 RF PART Circuit Description

1.1 ZIGBEE : EM3587(U206)

The Ember EM3587 is a fully integrated System-on-Chip that integrates a 2.4 GHz, IEEE 802.15.4-2003-compliant transceiver, 32-bit ARM® CortexTM-M3 microprocessor, flash and RAM memory, and peripherals of use to designers of ZigBee-based systems.

- 32-bit ARM® Cortex -M3 processor
- 2.4 GHz IEEE 802.15.4-2003 transceiver & lower MAC
- 256 or 512 kB flash, with optional read protection
- 32 or 64 kB RAM memory
- AES128 encryption accelerator
- Flexible ADC, UART/SPI/TWI serial communications, and general purpose timers
- Optional USB serial communications
- 24 highly configurable GPIOs with Schmitt trigger inputs

1.2 WLAN/BT : SWB-B80(U208)

SWB-B80 is the combo module for IEEE 802.11 a/b/g/n/ac Wireless LAN with 2x2 MIMO support and Bluetooth 4.1 + LE at embedded and mobile applications. It is based on Broadcom BCM4354 solution which comprises single chip dual band IEEE 802.11 a/b/g/n/ac 2x2 MAC/Baseband/Radio with integrated Bluetooth 4.1 + LE. • Wireless local area network (WLAN) compliant with the IEEE 802.11 b/g/n specification

- WLAN - IEEE 802.11ac Draft compliant
- Dual-stream spatial multiplexing up to 867Mbps data rate
- Supports 20, 40, and 80MHz channels with optional SGI (256 QAM modulation)
- Full IEEE 802.11 a/b/g/n legacy compatibility with enhanced performance

- Tx/Rx low-density parity check (LDPC) support for improved range and power efficiency
- Support IEEE 802.11ac/n beamforming
- Bluetooth – Bluetooth 4.1 + LE
- Bluetooth Class 1 or Class 2 transmitter operation
- Low power consumption
- Compact dimension: 9.20 x 5.70mm / Hmax : 1.20 mm
- Host Interfaces: SDIO v3.0 for WLAN, UART/PCM for Bluetooth
- RoHS compliant

2. ARTIK 10 Baseband Circuit Description

2.1 AP : S5E5422(U1)

Exynos 5422 is a system-on-a-chip (SoC) based on the 32-bit RISC processor for Smartphone tablet, laptop, and desktop PCs. Designed with the 28 nm low power HKMG process, Exynos 5422 provides the best performance features such as CORTEX-A15 quad and CORTEX-A7 quad core CPU, highest memory bandwidth, WQXGA display, 1080p 60 fps (frames per second) video decoding and encoding hardware, 3D graphics hardware, image signal processor, and high-speed interfaces such as eMMC5.0, and USB 3.0.

- ARM Cortex-A15 Quad CPU (Eagle) with NEON as high performance processor
  - 32 KB (Instruction)/32 KB (Data) Cache and 2 MB L2 Cache
- ARM Cortex-A7 Quad CPU (Kingfisher) as power-efficient performance processor
  - 32 KB (Instruction)/32 KB (Data) Cache and 512 KB L2 Cache
- 128-bit Multi-layer Network-on-Chip (NoC) architecture
- Cache Coherent Interface (CCI) among Cortex-A15 and Cortex-A7, G2D, G3D and SSS
- Memory Subsystem:
  - 2-ports 32-bit up to 933 MHz LPDDR3/DDR3 Interfaces
  - 2-ports 32-bit up to 533 MHz LPDDR2 Interfaces
- Multi-format Video Hardware codec (MFC): 1920x1080@120fps (capable of decoding and encoding MPEG-4/H.263/H.264/VP8 and decoding of MPEG-2/VC1 video) and upto 8192x8192 H.264 and VP8 encoding/decoding

2.2 Memory : KLMAG2GEAC-B002 (U6)

The Samsung KLMAG2GEAC-B002 is a 16 GB eMMC flash memory

- embedded MultiMediaCard Ver. 4.5 compatible. Detail description is referenced by JEDEC Standard
- SAMSUNG e·MMC supports features of eMMC4.5 which are defined in JEDEC Standard
  - Supported Features : Packed command, Cache, Discard, Sanitize, Power Off Notification, Data Tag, Partition types,
    Context ID, Real Time Clock, Dynamic Device Capacity, HS200
  - Non-supported Features : Large Sector Size (4KB)
- Additional feature : DDR400 mode (200MHz DDR - up to 400Mbps)
- Full backward compatibility with previous MultiMediaCard system specification (1bit data bus, multi-e·MMC systems)
- Data bus width : 1bit (Default), 4bit and 8bit
- MMC I/F Clock Frequency : 0 ~ 200MHz
  MMC I/F Boot Frequency : 0 ~ 52MHz
- Temperature : Operation (-25 C ~ 85 C), Storage without operation (-40 C ~ 85 C)
- Power : Interface power → VDD(VCCQ) (1.70V ~ 1.95V or 2.7V ~ 3.6V) , Memory power → VDDF(VCC) (2.7V ~ 3.6V)

2.3 PMIC : S2MPS11B02(S2MPS11B2) (U4)

S2MPS11 is an advanced Power Management IC (PMIC) designed for mobile applications. S2MPS11, coupled with Multi Core Samsung Application Processors (Exynos5410), is used in a wide variety of mobile applications such as smart phones and tablet PCs.

- 9 High-Efficiency and programmable Buck Converters (1 Dual Phase Buck)
- 1 High-Efficiency and programmable Buck-Boost Converter
- 38 LDO Regulators (31 PMOS LDOs, 7 NMOS LDOs, N:NMOS type LDO , P:PMOS type LDO)
- RTC with two alarms
- Three Buffered 32.768 kHz Outputs (for AP, CP, and B/T)
- One Back up battery charger
- Reset Output
- Under Voltage Lock Out / Thermal Shutdown / BandGap Reference
- Power-on Sequence
- I2C Interface for Programming

3. ARTIK 10 Antenna Description

Antenna information can be found at the link below.

https://developer.artik.io/documentation/getting-started-beta/antenna-locations.html

MODULE DISCLOSURES – QUICK START GUIDE

FCC REGULATORY DISCLOSURES

This device complies with Part 15 of the FCC`s Rules. Operation is subject to the following two Conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesirable operation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the transmitter's radiating structure(s) and the body of the user or nearby persons.

This module is intended for OEM integration. The OEM integrator is responsible for FCC compliance and compliance with all applicable regulations including those for modular transmitters 47 C.F.R. 15.212. The OEM product must comply with all applicable labeling requirements including those contained in 15 C.F.R. 15.19. The OEM is solely responsible for certification and testing and labeling of its own products. In addition to any independently required labels, the OEM shall also affix to the outside of a device into which the module is installed a label referring to the enclosed module. This exterior label should be prepared in a legible font and permanently affixed and using the wording "Contains Transmitter Module FCCID: [A3LATKM102000]

The OEM is required to ensure that the end product integrates this module so as to maintain a minimum distance of 20 cm between the equipment's radiating structure(s) and the body of the user or nearby persons. The OEM shall also advise its end user of this requirement as required by applicable rules.

The OEM shall require that the end user of its product be informed that the FCC radio frequency exposure guidelines for an uncontrolled environment can be satisfied. The OEM shall further inform its

end user that any change or modifications to this module not expressly approved by the manufacturer will void the warranty and the users' authority to operate the equipment.

INDUSTRY CANADA REGULATORY DISCLOSURES

INDUSTRY CANADA STATEMENT

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). L'opération est soumise aux deux conditions suivantes:(1) cet appareil ne peut causer d'interférences, et
(2) cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

INDUSTRY CANADA RADIATION EXPOSURE STATEMENT AND LIMITATIONS ON USE

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This equipment should be installed and must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment is restricted to indoor use in the 5.15-5.25 GHz range. This equipment is not able to be operated at 5600-5650. In the United States and Canada, only Channel 1~11 can be operated and these channel assignments deal only with the 2.4 GHz range.

The end product must be labeled to display the Industry Canada certification number of the module.
"Contains transmitter module IC: 649E-ATKM102000"
Le dispositif d'accueil doivent être étiquetés pour afficher le numéro de certification d'Industrie Canada du module.
Contient module émetteur IC : 649E-ATKM102000

EU REGULATORY DISCLOSURES

CE STATEMENT *

The following statement must be supplied with each product but can be printed in the user manual, the packaging, or provided as a separated leaflet.

Hereby, Samsung declares that this IoT Module is in compliance with the essential requirements and other relevant provisions of Article 3 of the R&TTE Directive 1999/5/EC, 2004/108/EC and RoHS directive 2011/65/EU.

"The declaration of conformity may be consulted at [www.artik.io/]"