Operation Description

1 System Overview

1.1 Overview

UMW2652 is a highly integrated 4-in-1 connectivity single chip which offers the lowest RBOM in the industry for smart phone, PC, STB, OTT, IoT and automotive applications.
This chip includes 2.4 GHz WLAN IEEE 802.11 b/g/n Radio, Bluetooth 5 with supporting high power mode, Direction Finding and Long Range, multiple mode concurrent reception of GPS/Galileo/Glonass/Beidou(B1I & B1C) satellite systems and an FM receiver. Additionally, this radio-on-a-chip integrates power amplifiers, receive low noise amplifiers and RF TR switch.
It supports SDIO 3.0 for Wi-Fi, high-speed 4-wire UART for Bluetooth and GNSS, I2C/UART for Android Context Hub.
Advanced Spreadtrum Green Wi-Fi power management features optimize Wi-Fi active and low power states to extend operating lifetime for battery driven devices.

Spreadtrum Chorale provides high performance multiple radio coexistence and antenna sharing technology for Wi-Fi, Bluetooth, GNSS and LTE operating concurrently in compact system design.

1.2 Features

1.2.1 General Features

- Dual ARM Cortex M4 architecture with platform computing offloading and advanced energyefficient management features
- Rich interfaces support variant application development– SDIO 3.0, 4 x UART, I2S/PCM, I2C,SPI for NOR Flash and Display, WCI-2, JTAG, GPIOs, PWM
- Integrated Android Context Hub interface, supports low power and offloading profiles ofcontext awareness applications
- Supports standard crystal TSX and reference clock output
- Supports external Wi-Fi 2.4 GHz PA and LNA
- Supports world wide regulatory
- 152 Ball BGA package (size 5.3 mm x 6.5 mm)

1.2.2 Wi-Fi Features

- Dual band 2.4G IEEE 802.11b/g/n
- Complies with Wi-Fi VHT R2, supports DL MU-MIMO and beamformee
- SpreadtrumExtreme provides QAM-256 in 2.4 GHz band to improve 33% PHY data rate
- Spreadtrum Chorale antenna sharing and coexistence solution delivers excellent LTE,

Wi-Fi,Bluetooth 5, GNSS concurrent operation performance in a compact and cost effective systemdesign

 Spreadtrum Green Wi-Fi provides excellent low power consumption features in Wi-Fi normaloperation and low power states

 Supports IEEE 802.11 FTM, Wi-Fi Location and timing measurement

 Supports WMM-PS QoS, Wi-Fi Direct, Miracast R2, Passpoint 2.0, Wi-Fi Aware, etc.

•Supports WEP,WPA/WPA2/WPA3-Personal/WPA3-Enhanced Open, WPS 2.0, WAPI, WPI-SMS4, EAP-TLS/EAP-TTLS/EAP-PEAP/EAP-SIM/EAP-AKA/EAP-AKA', IEEE 802.11wProtected Management Frame

 Complies with IEEE 802.11 d/e/h/i/k/r/u/z

 Supports both single andmultiple channel concurrency

 Supports background scan, ARP, TCP/UDP checksum offload, IPv6 NS/RA offloading

 Supports spur immunity to avoid performance degradation caused by spur generated by PCB

1.2.3 Bluetooth Features

 Bluetooth 5, Bluetooth Smart Ready compliant

 Bluetooth classic and Low Energy dual mode concurrent operation

 Supports LE 2 Mbps, LE Advertise Extension, Long Range, AoD Rx Direction Finding andMesh

 Integrated 10 dBm high efficiency on-chip PA for low energy application

 Integrated 20dBm high power on-chip PA for Bluetooth high power mode application

 Integrated wide-band speech processing to improve voice quality

 Supports Low Energy background scan for context awareness applications

 Supports multiple piconets and up to 8 concurrentBluetooth Low Energy concurrent links

1.2.4 GNSS Features

 Dual band concurrent reception of GPS/Galileo/GLONASS/Beidou(B1I & B1C) to improvelocation accuracy and positioning performance

 Fully A-GNSS compliant and capabilities, supports SUPL/A-Beidou/A- GLONASS

 Integrated high performance RF path to reduce system design complexity

 Supports Satellite Based Argumentation systems (SBAS)

 Supports high location accuracy, less than 1 m

 Excellent tracking and hot start sensitivity

 Supports inertia tracking

1.2.5 FM Features

- Supports frequency range of 65 MHz ~ 108 MHz
- Supports RDS
- Digital stereo demodulator
- Digital audio interface (I2S)
- Stereo Mono blending and auto selectivity

Crystal 2520 26MHZ 9.0PF SXT25Y026000B91T02

Equivalent series resistance (ESR) : 30 ω Main frequency: 26MHz Frequency tolerance: ±10ppm Load capacitance value: 9pF

Bluetooth

Operating Frequency	2402MHz~2480MHz
Modulation	GFSK, π/4-DQPSK, 8-DPSK
Number of Channels	79 Channels
Antenna Type	PIFA Antenna
Antenna Gain	1.1dBi

BLE

Operating Frequency	2402MHz~2480MHz
Modulation	GFSK
Number of Channels	40 Channels
Antenna Type	PIFA Antenna
Antenna Gain	1 .1dBi

WIFI2.4G

Operating Frequency	2412-2462MHz for 802.11b/g/11n(HT20); 2422-2452MHz for 802.11n(HT40);
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Number of Channels	11 channels for 802.11b/g/11n(HT20); 7 channels for 802.11n(HT40);
Antenna Type	PIFA Antenna
Antenna Gain	1.1dBi

GSM/WCDMA

Operating Frequency	☒GSM850: TX824.2MHz~848.8MHz /RX869.2MHz~893.8MHz; ☒UMTSFDD Band V: TX826.4MHz~846.6MHz /RX871.4MHz~891.6MHz; ☒PCS1900: TX1850.2MHz~1909.8MHz /RX1930.2MHz~1989.8MHz; ☒UMTS FDD Band II: TX1852.4MHz~1907.6MHz /RX1932.4MHz~1987.6MHz; ☒UMTS-FDD Band Ⅳ:TX1710MHz~1755MHz /RX2110MHz~2155MHz
Modulation	☒GMSK for GSM/GPRS; ☒8PSK for EGPRS; ☒QPSK for UMTS bands;
Power Class	4, tested with power level 5(GSM 850) 1, tested with power level 0(GSM 1900) 3, tested with power control “all 1”(WCDMA Band II/IV/V)
GPRS Class	☒Multi-Class12 ☒Only 4 timeslots are used for GPRS and EGPRS
Antenna Type	PIFA Antenna
Antenna Gain	0.59dBi

LTE

Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band4Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE-FDD Band7Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	0.57dBi,