



EMBEDDED WIRELESS PROCESSING



Operating System 6.60 & Wireless CPU Q2686

Version 6.0

wavecom[®]
Make it wireless

OS6.60/Q2686: Product Offer

Our Product Offer

Solution Intro.

Wireless CPU

Open AT® OS

Open AT® Apps

Open AT® IDE

Open AT® Plug-Ins

DOTA

IPR

Quality

Packages

Pro Services

Support

- Each product offer in the portfolio encompasses 3 core elements and is serving the markets & applications following :



OS6.60/Q2686: Introduction

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→ OS 6.60 on Q2686 is the latest in a range of embedded wireless processing solutions from Wavecom that:

- brings powerful **Wireless Computing Power** for Automotive, industrial M2M and Mobile Professional applications,
- supports as standard, the most powerful **Cellular Embedded Application Environment**
- has **largest set of hardware interfaces** available in any GSM modular hardware platform.
- is **interchangeable** with **Q2687**.
- works on **any global GSM network**, thanks to **Quad Band*** and **Quad Codec****



*850MHz, 900MHz, 1800MHz, 1900MHz

**HR, FR, EFR, AMR

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OS6.60/Q2686: Solution Positioning

OS 6.51

OS 6.55

OS 6.56

OS 6.57

OS 6.60

OS 6.61

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Open AT® OS
- Execute Open AT® Applications.
- DOTA Type I (Apps)
- 32KHz sleep mode

Open AT® Plug-Ins
- TCP/IP
- Internet

Wireless CPU
- ARM7 core, 52MHz
- Cache memory
- 1-6 MIPS
- Dual Band
- GSM or GPRS
- 11 GPIO
- ADC
- 2 UART
- 3mA Idle



Open AT® OS
- DOTA Type II (OS)
- VariPower
- Data Logging
- CMUX

Wireless CPU
- 9-13 MIPS
- Double Dual Band
- GPRS
- GPS* (Q2501)

Open AT® Firmware
- Bluetooth SAP*



Open AT® OS
- Easy PLMN change

Open AT® Plug-Ins
- Open AT® GTi*
- IBM MQTT*

Open AT® Firmware
- Bluetooth* profiles: HSAG, SPP



Open AT® OS
- DOTA III+
- Machine Network Agent+
- Security+
- Internet+

Open AT® Plug-Ins
- MMS PDU Client

Wireless CPU
- Quad band GPRS
- Ext. Temp.*

Open AT® Firmware
- Quad band radio



Wireless CPU
- ARM9, core 104MHz
- Quad band GPRS
- 2 ADC
- USB 2.0
- 1.7mA Idle
- 44 GPIO
- 3 x RF connectors
- Temp -40°C / +85°C

Open AT® Firmware
- Quad audio codec
- Digital audio
- Ext. Temp.*
- New AEC algorithm



Open AT® OS
- RTOS

Open AT® Plug-Ins
- C-GPS

Wireless CPU
- Quad band EDGE
- Expansion port

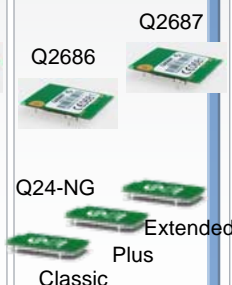
Open AT® Firmware
- Parallel interface



Open AT® OS
- Not published

Open AT® Plug-Ins
- Not published

Open AT® Firmware
- Not published



OS Feature Delta Introductions →

OS6.60/Q2686: Wireless CPU

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→ Class leading

Wireless Computing Power

- 104MHz 32bit ARM9
- Up to 21 MIPS for customer application



The most powerful
**CELLULAR
EMBEDDED
APPLICATION
ENVIRONMENT**



V8
Supercharged

→ More RAM for Open AT® : 256kByte

→ More Flash for Open AT® : 1.5MByte (+128kByte for objects)

→ Extended Temperature range : -40/+85°C

→ Largest set of interfaces on the market:

- USB 2.0, up to 44 GPIO, 2 UART, 2 SPI, 1I2C, 2 Audio, 1PCM, 2 ADC, 2 Interrupt, 5 x 5 Keyboard

→ Embedded RF connector or IMP or solder cable



* 40 x 32.2 x 4.0mm

** compared to Q24 GSM/GPRS Series

OS6.60/Q2686: Open AT[®] Operating System

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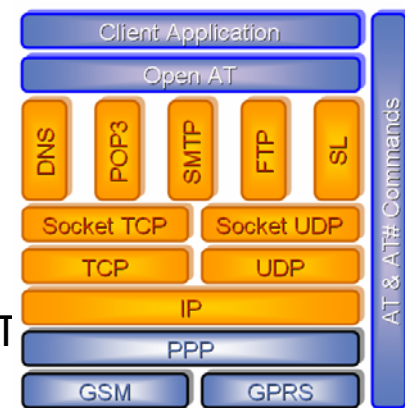
Pro Services

Support

➔ At the heart of the Q2686 beats the powerful **Wavecom Open AT[®] Operating System 6.60** that provides:



- **Open AT[®]** application environment.
- **Real time processing***
- **Internet Plug-In** as standard:
 - **Basic** Internet Protocols : TCP/IP/UDP/DNS
 - +
 - **Extended** Clients : Email (POP3, SMTP), File Transfer (FTP & HT
- **VariPower** modes:
 - **Mode 1** (32KHz), **Mode 2** (GSM Disconnected), **Mode 3** (Alarm)*
- Enhanced audio **echo cancellation**, **noise reduction** and **VDA2B** audio compliance
- OS roadmap for additional features to come...



**99% of CPU available in GSM disconnected mode
with guaranteed response time*

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OS6.60/Q2686: Open AT[®] Applications

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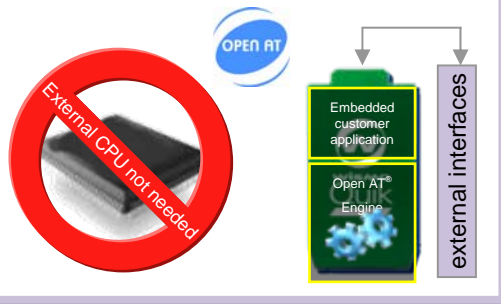
Pro Services

Support

→ **Open AT[®]** is the worlds leading **CELLULAR EMBEDDED APPLICATION ENVIRONMENT** for the creation of innovative applications because it allows you to:

- **develop** and **execute** your applications **directly** on Wavecom Wireless CPUs,
- **eliminate** external host **processors**, **memory** & **discretes** & associated design costs
- **reduce** the total **cost of ownership** for **end-to-end solutions**,
- **reduce** the physical **size** of the end product,
- **reduce** the **power consumption** using a range of dedicated low power modes,
- **update** your application using **DOTA** to release new features or correct software issues
- **secure** your **investment** in your **intellectual property** via copy and reverse engineering protection,
- **develop** new **features** on the Wireless CPU while other suppliers have to make new devices.

Open AT[®] Standalone Mode:



Open AT[®] Cooperative Mode:



[jump to example](#)

OS6.60/Q2686: Open AT® IDE

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➔ The Open AT® Development Environment provides a **rich set of easy to use graphical tools:**

1

Open AT® Project Wizard

2

Visual C++ Development Environment

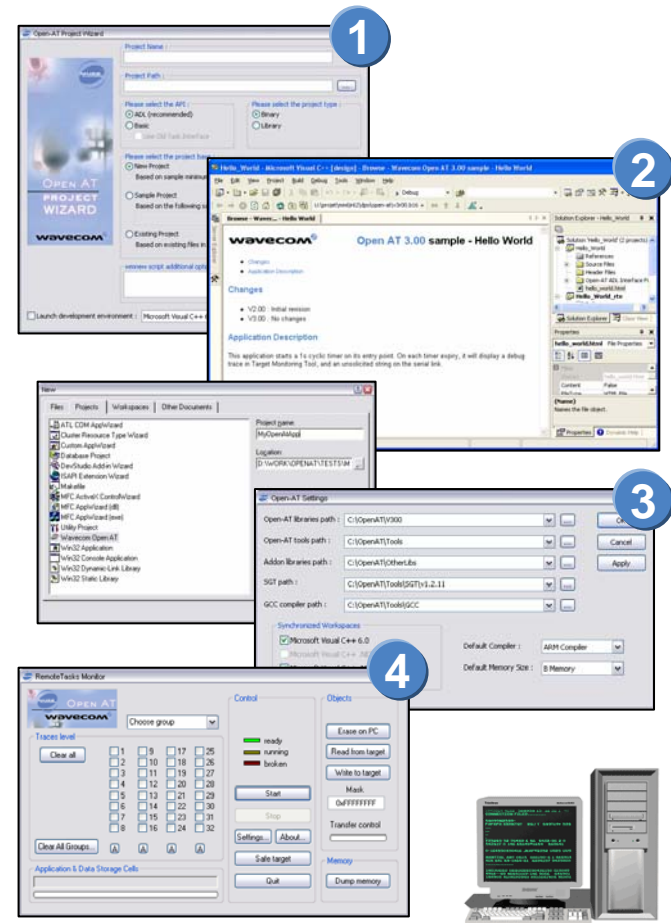
3

Open AT® Settings Application

4

Remote Task Monitor

HTML Help



OS6.60/Q2686: Download Over The Air



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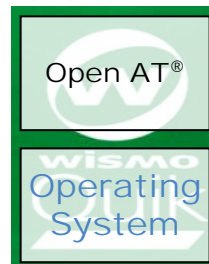
Packages

Pro Services

Support

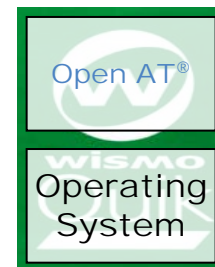
→ DOTA Type 1 : Open AT® Application

- Update your applications remotely in the field*.
- Save costs of visiting or recalling product from the field.
- Use it to deliver new features or rectify abnormalities.



→ DOTA Type 2 : Wavecom Operating System

- OS 6.60 allows you to download the entire Wavecom Operating System over the air.



→ Both DOTA Types are designed to increase service revenue for System Integrators and Service Providers.



**1.2MByte available for customer application download*

OS6.60/Q2686: Intellectual Property

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- When choosing a cellular solution supplier, it is critical that the GSM* IPR is covered.
- **The Law:** *“Any product manufacturer integrating GSM technology shall pay royalties owed to third parties in respect of essential Intellectual Property Rights to Patent Holders”*
- This can represent **up to 20%** of the price of the final product
- Our selling prices include IPR coverage: our customers do not have to pay anything more: **AN IPR INCLUSIVE OFFER**
- The low end modules manufacturer companies do not have this coverage in their product:

OEM manufacturers using module suppliers not covering IPR cannot export to Europe and the USA
- Many customers and **even our competitors** are coming back to us in order to be able to export their products.



*CDMA IPR also covered for CDMA products

OS6.60/Q2686: Quality Assurance

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- All Wavecom products are manufactured at Solectron, Suzhou which is certified to automotive standards:
 - ISO TS 16949
- **Fully Certified** to R&TTE directive, CE marking, GCF-CC, FCC/PTCRB, China RTE
- Reliability:
 - T0: 200 ppm
 - 1 year: 300 ppm
- RoHS* compliant
 - EU Green Policy Directive



**Restriction of Hazardous Substances*

OS6.60/Q2686: Package Flexibility

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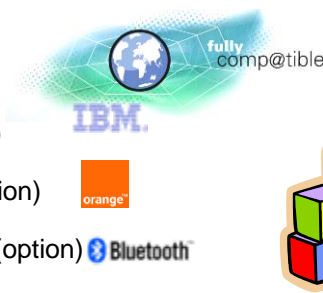
Packages

Pro Services

Support

→ OS Packages

- **Series410:** Open AT® + Internet Plug-In (standard)
- **Series312:** Open AT® + IBM MQ TT Plug-In (option)
- **Series313:** Open AT® + M2M Connect Plug-In (option)
- **Series415:** M2M410 + Bluetooth OS Component (option)
- **Series505:** Open AT® + GTi Developer Suite (option)



→ Hardware Platform Compatibility

Q2686H : 32Mbit Flash/8Mbit RAM*
(4MByte Flash/1MByte RAM)



→ Automotive Qualification

- PPAP process controls
(automotive manufacturing process)

→ Development Kit

- Open AT® SDK, 2 x Q2686H, development board, handset, Serial cable, quad band antenna, power cable, power supply, CD documents



**Refer to detailed specification for Open AT® available memory*

OS6.60/Q2686: Wavecom Professional Services

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Open AT® Plug-Ins

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→ Wavecom provide a range of professional services to help customers deliver applications to market in record time. Here are just a few:

IMEI Triple Offer



- **CUSTOMER:** Let Wavecom download your personal IMEI
- **WAVECOM:** Use Wavecom approved IMEI
- **INACTIVE:** Get default IMEI and reprogram in your facility

Open AT® University

- Get your developers professionally trained by a qualified instructor
- Open Sessions run quarterly
- Private sessions on demand

Open AT® Code Review

- Source code review (under NDA)
- Extensive evaluation report
- Essential educational tool for both experienced and new developers

OS6.60/Q2686: Wavecom Support

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→ Wavecom's wireless expertise is available for you to maximise your potential...

→ Extensive Online Support

- Sales & Marketing materials
- Extensive FAQ database
- Technical Documentation
- Carrier certification
- Type approval certificates & reports*
- Free Application Notes on website*
- Latest OS releases*
- Open AT® SDK downloads*
- Automatic updates via mailing list subscription*

→ Online OS Developers Forum

- Free community in which to openly discuss any aspect relating to Wavecom OS, including Open AT® open to all Wavecom customer developers.

Generic - New AN Template

Number	Title	Category	Download
A001	Call Management with Keypad	Basic	
A002	Hands Free Speaker Phone	Intermediate	
A003	-	-	-
A004	Floating Point Arithmetic Library	Basic	
A005	Auto TCP Socket Data connection	Intermediate	
A006	Graphical Engine & LCD Driver	Intermediate	

Generic - Original AN Template

Number	Title	Category	Download
EOS005	Creating an Open AT 2.x Library	Basic	
EOS007	Porting Open AT application from WH library to ADL library	Intermediate	
EOS008	Modified AT commands and API Interfaces for UART2	Basic	
EOS009	Suspending & resuming Open AT applications with interrupt mode	Basic	
EOS010	Steps to create a DWL file for Open AT ADL application	Basic	
EOS011	Using FCM flow in an Open AT application	Basic	
EHW016	Bluetooth Interface for AT x55	Advanced	
EHW001	Q25 Dead Reckoning	Basic	
EHW002	EAN V2.0B Interface	Intermediate	
EHW003	USB 1.1 Interface	Intermediate	
EHW004	USB 2.0 Interface	Intermediate	

Application Note Examples

www.wavecom.com/support

www.wavecom.com/approvals

*Requires customer login account (request from your sales manager)



THANK YOU

Appendices Follow

Appendix 1: Specification Summary

WAVECOM OPERATING SYSTEM

Open AT® Firmware: 6.60
Open AT® OS : 4.0
DOTA: Type 1 : Open AT® Applications
Type 2 : Wavecom OS
Clock: RTC with calendar
Battery: LiIon, NiMH, NiCD Charging Algorithm
Power Modes: 1 GSM Connected Mode,
2 GPRS Transfer Mode,
3 Fast Idle Mode,
4 Fast Standby Mode,
6 Slow Idle Mode,
5 Slow Standby Mode,
7 Alarm Mode,

DEVELOPMENT SUITE

Open AT® IDE : - CD-ROM Installer
- Open AT® Project Wizard
- Visual C++ Development Environment
- Open AT® Settings Application
- Remote Task Monitor
- HTML Help & documentation
- Sample Applications



DEVELOPMENT KIT

Open AT® IDE	2 x Q2686
Development board	Handset & cable
Quad band antenna	Serial cable
Power cable	Power supply
Documents on CD	

SERVICES & SUPPORT

Open AT® University,
Open AT® Application Download,
Design Review (Schematic & PCB),
Certification Support, Fast Redownload
Online Support www.wavecom.com/support

Wireless CPU

Core: ARM 946E-S, 32bit, 104MHz, 30MIPS
Technology: GSM
Interchangeable: OS6.61/Q2687
Data: GPRS Class 10, Class B & CSD 14.4
Size: 40 x 32.2 x 4.0mm
Weight: <9g
Shielding: Fully shielded
On Board Memory: Q2686H : 32Mbit Flash/8Mbit RAM
Bands: 850/900/1800/1900MHz
RF Power: 2W (850/900MHz)
1W (1800/1900MHz)
Audio Codecs: FR/HR/EFR/AMR
Audio Quality: Enhanced AEC & NR
I/F Connector: 100pin NAIS AXK600345J
RF Connectors: U.FL, 50Ω

Interfaces: Solder pad for RG178 cable
USB 1.1 Slave
2 x UART
PCM (Digital Audio Interface)
2 x Analogue Audio (2 mic, 2 spkr)
2 x ADC (10bit, 0-2V, 216sps)
Up to 44 GPIO
Buzzer output
2 x Interrupt
LED driver
SIM: 3V & 1.8V
Keyboard: 5 x 5
Peripherals: Via SPI or I2C interface (LCD)
Power Supply: TBD minimum
3.6V nominal
TBD maximum

Consumption: 16µA (Off)
39 mA (Fast idle mode)
38 mA (Fast stand by mode)
1.45A peak (Dedicated Mode)
Battery Charger: LiIon, 800mA maximum
RTC Backup: Via external battery

APPROVALS

Automotive:	PPAP
Manufacturing:	ISO TS 16949
Regulatory:	R&TTE directive CE marking GCF-CC FCC/PTCRB China RTE
IMEI:	Embedded, BABT allocated

QUALITY & ENVIRONMENTAL

For standard solution:
Target ppm T0: 200 ppm
Target ppm 1 year: 300 ppm
Temperature: Class A* -20°C to + 55°C
Class B* -40°C to + 85°C
Storage -40°C to + 85°C
Green Policy: RoHS Compliant
Directive 2002/95/EC

PACKAGE CONFIGURATIONS

M2M410: Open AT® + Internet Plug-In*
M2M412: Open AT® + IBM MQ TT Plug-In*
M2M413: Open AT® + Orange M2M Connect*
M2M415: M2M410 + Bluetooth OS Component
GTI800: Open AT® + GTI Developer Suite

(*each add on package is available as both an Open AT® application or an embedded library)

*Refer to slide note for additional information

all specifications are subject to change and
do not indicate any contractual commitment

Appendix 2: What Is The Wavecom Open AT® OS?

“I am the powerful brain that listens, thinks & acts.”

The **embedded upgradeable software** in Wavecom hardware platforms that accepts **inputs** and **commands** from **external peripherals/interfaces** such as a keyboard, SIM, cellular network, analogue & digital inputs, in addition to **internal programs** running under **Open AT®** and **reacts to/responds** to these inputs by performing **simple** or **complex calculations** and **tasks**, **changing the state** of the external peripherals/interfaces that it connects to and **communicating with external networks** such as the internet.



A few examples:

- A simple external AT® command issued to set up a call or send an SMS in a car alarm.
- An Open AT® application making an API command request to the OS to turn on a warning horn and send an SMS to indicate a flood in a remote part of the world.
- A pre-set time activated alarm that wakes up the OS and Open AT® to connect the hardware platform to the cellular network to send an electricity meter report via email and then go back to sleep.
- A soft drinks vending machine Open AT® application downloads the prices for the day and a multimedia sales promo via FTP.
- A complex graphical user interface for a wireless local loop phone that is driven by a keyboard and an LCD display.
- A new Open AT® application or the entire OS is downloaded over-the-air.
- Intelligent monitoring and charging of the Lilon battery.

Appendix 3: Reducing Total Cost of Ownership

- Single Phase AMR
 - Proof of Concept
- WISMO with Open AT® and Internet Package providing:
 - LCD Control
 - User Interface
 - Optical Interface
 - Email reporting
 - NTP time synchronisation*
 - Cooperative Processor Interface
- Cooperative Processor: ST or ADI

*Network Time Protocol (free synchronisation with thousands of global Internet NTP servers)

