



EMBEDDED WIRELESS PROCESSING



Operating System 6.61 & Wireless CPU Q2687

Version 5.0

wavecom 
Make it wireless

OS6.61/Q2687: Product Offer

Our Product Offer

Solution Intro.

Wireless CPU

Open AT® OS

Open AT® Apps

Open AT® IDE

Open AT® Plug-Ins

DOTA

IPR

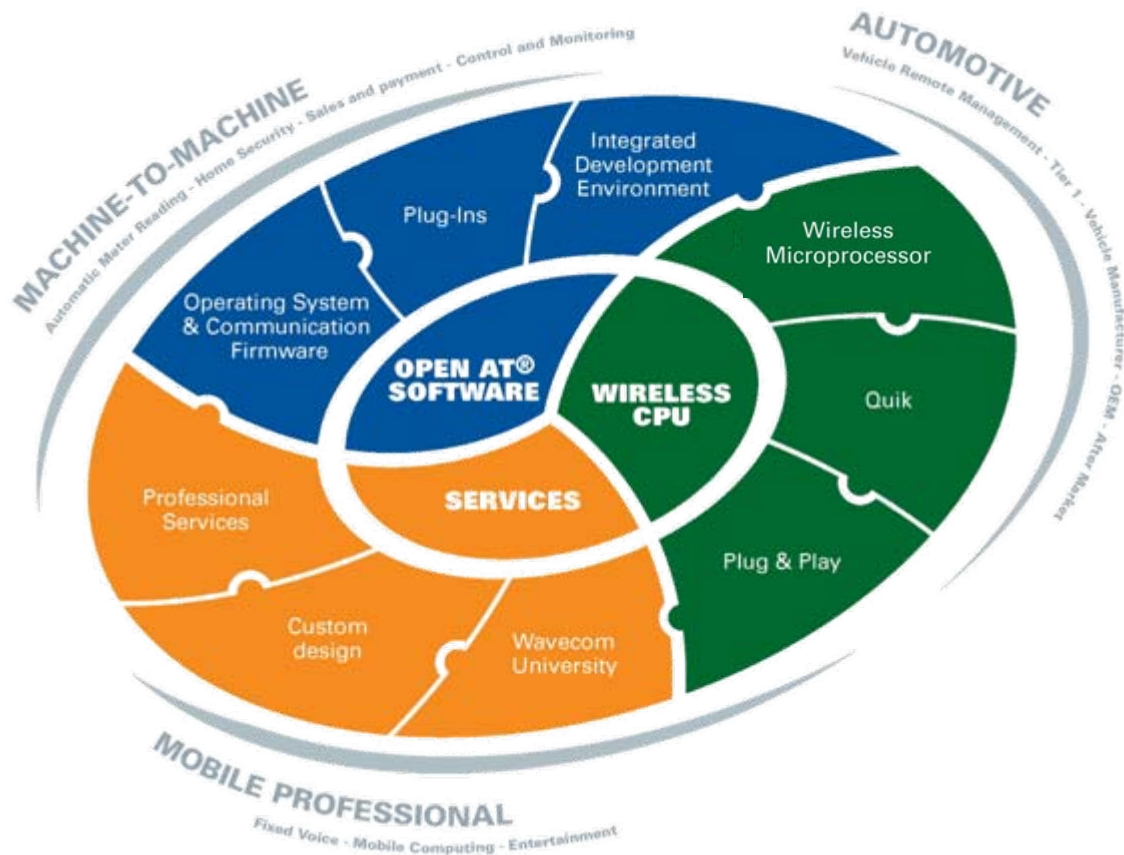
Quality

Packages

Pro Services

Support

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



OS6.61/Q2687: Introduction

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

→ OS 6.61 on Q2687 is the latest in a range of pre-packaged solutions from Wavecom that:

- brings powerful **Wireless Computing Power** for 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/GPRS/EDGE modular hardware platform.
- is **interchangeable** with Q2686.
- works on any **global GSM network**, thanks to **EDGE, Quad Band*** and **Quad Codec****.



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

**HR, FR, EFR, AMR

WAVECOM©2005. All rights reserved

OS6.61/Q2687: Solution Positioning

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

OS 6.51

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



OS 6.55

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*



OS 6.56

Open AT® OS

- Easy PLMN change

Open AT® Plug-Ins

- Open AT® GTi*
- IBM MQTT*

Open AT® Firmware

- Bluetooth*
- profiles: HSAG, SPP



OS 6.57

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



OS 6.60

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



OS 6.61

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 →

OS6.61/Q2687: Wireless CPU

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

→ The tiny* Class leading

Wireless Computing Power

• 104MHz 32bit ARM9

• Up to 87 MIPS



• The most powerful
**CELLULAR
EMBEDDED
APPLICATION
ENVIRONMENT**



V8
Supercharged

→ More Open AT® memory to embedded huge application memory

→ Extended Temperature range for hostile industrial environments (-40° +85°)

→ Large set of interfaces to extend connectivity

(USB 2.0, up to 44 GPIO, 2 UART, 2 SPI, 1I2C, 2 Audio, 1PCM,
2 ADC, 1DAC, 1 parallel, 2 Interrupt, 5 x 5 Keyboard)

→ Several RF connections to enable flexibility

→ EDGE Class 10, GPRS Class 10 to support high speed technology



* 40 x 32.2 x 4.0mm

OS6.61/Q2687: Open AT[®] Operating System

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

→ At the heart of the Q2687 beats the powerful **Wavecom Open AT[®] Operating System 6.61** that provides:



- **Open AT[®]** application environment.
- **Real time Operating System**
 - 1 ms latency to Interrupts
 - Improved Interrupt & precision Timer access
- **VariPower** modes
- **VariSpeed**
- Enhanced audio **echo cancellation**, **noise reduction** and **VDA2B** audio compliance
- **Microsoft[®] Windows[®] Mobile[™]** compatible

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

wavecom[®]
Make it wireless

OS6.61/Q2687: Open AT[®] Applications

Our Product Offer

Solution Intro.

Wireless CPU

Open AT[®] OS

Open AT[®] Apps

Open AT[®] IDE

Open AT[®] Plug-Ins

DOTA

IPR

Quality

Packages

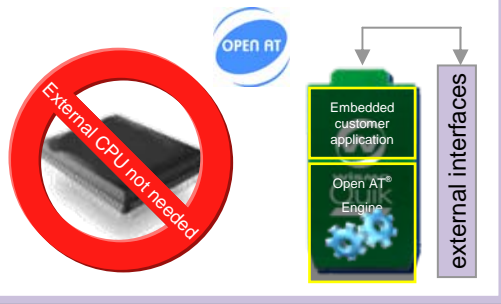
Pro Services

Support

→ **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](#)

OS6.61/Q2687: Open AT® IDE

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

➔ The Open AT® Eclipse Development Suite provides a licence free, a **rich set of easy to use graphical tools**:

1



Framework

2

Open AT® Project Wizard

3

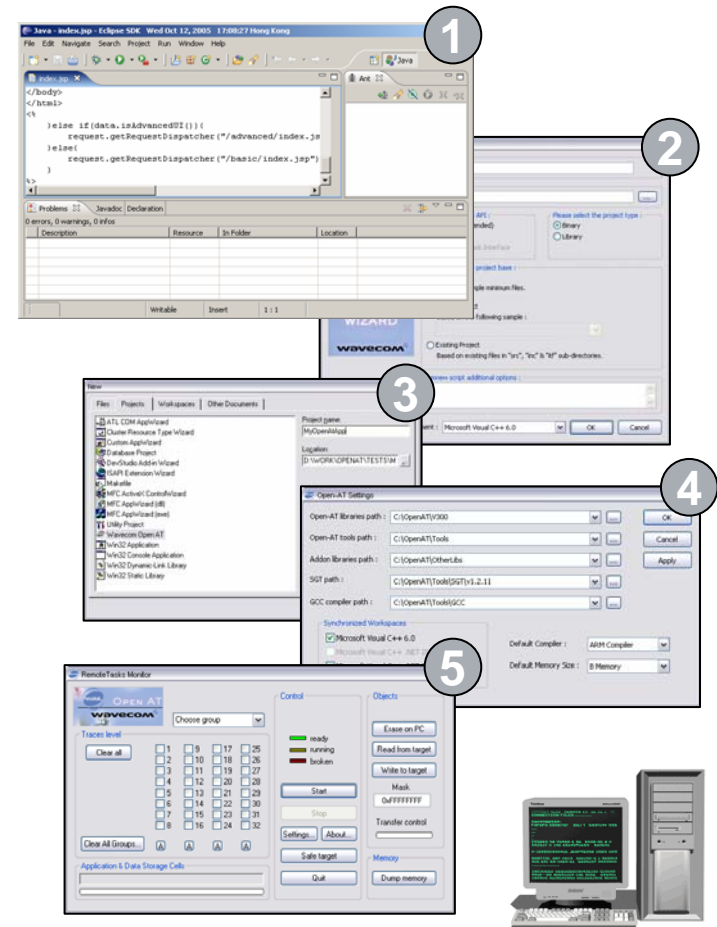
CDT Eclipse Plug-In

4

Open AT® Settings
Application

5

Remote Task Monitor



Our Product Offer

Solution Intro.

Wireless CPU

Open AT® OS

Open AT® Apps

Open AT® IDE

Open AT® Plug-Ins

DOTA

IPR

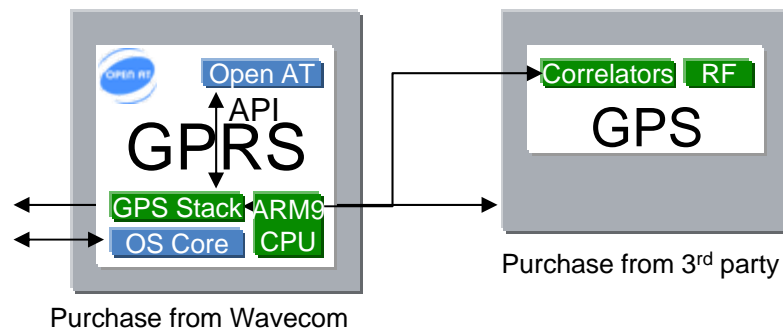
Quality

Packages

Pro Services

Support

- ➔ The GPS software stack embedded as an Open AT Plug-In in the wireless CPU, is called “Controlerless-GPS” open AT® Plug-In



- ➔ The resulting effect is to minimize the physical size of the customer's final product and to reduce the cost of the complete design.

OS6.61/Q2687: Download Over The Air



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

→ 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.

Open AT®

WISMO
Operating
System

→ DOTA Type 2 : Wavecom Operating System

- OS 6.61 allows you to download the entire Wavecom Operating System over the air.

Open AT®

WISMO
Operating
System

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

DOWNLOAD OVER THE AIR

**1.2MByte available for customer application download*

WAVECOM©2005. All rights reserved

wavecom
Make it wireless

OS6.61/Q2687: Intellectual Property

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

- 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

OS6.61/Q2687: Quality Assurance

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

- 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, US carriers approval
- Reliability:
 - T0: 200 ppm
 - 1 year: 300 ppm
- RoHS* compliant
 - EU Green Policy Directive



**Restriction of Hazardous Substances*

OS6.61/Q2687: Package Flexibility

Our Product Offer

Solution Intro.

Wireless CPU

Open AT® OS

Open AT® Apps

Open AT® IDE

Open AT® Plug-Ins

DOTA

IPR

Quality

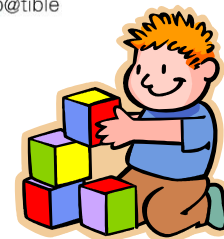
Packages

Pro Services

Support

→ OS Plug-In 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)



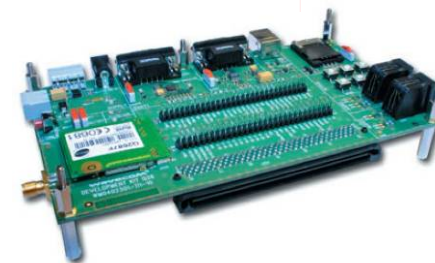
→ Hardware Platform Compatibility

Q2687H : 32Mbit Flash/8Mbit RAM*
(4MByte Flash/1MByte RAM)



→ Development Kit

- Open AT® IDE, 2 x Q2687, development board, handset, Serial cable, quad band antenna, power cable, power supply, CD documents



→ Application Notes on web site

→ Online OS developers Forum

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

OS6.61/Q2687: Wavecom Professional Services

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

→ 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

OS6.61/Q2687: Wavecom Support

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

→ 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: 6.61

Open AT® OS: 4.10

DOTA: Type 1 : Open AT® Applications

Type 2 : Wavecom OS

Clock: RTC with calendar

Battery: LiIon 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,

Microsoft® Windows® Mobile™ compatible

DEVELOPMENT SUITE

Open AT® IDE 4.10 :

-CD-ROM Installer

-Open AT® Project Wizard

-Eclipse environment

- CDT C++ Plug In

-Open AT® Settings Application

- Remote Task Monitor

- HTML Help

- Sample Applications



DEVELOPMENT KIT

Open AT® IDE	2 x Q2687
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

HARDWARE PLATFORM

Core: ARM 946E-S, 32bit, 104MHz, up

to 87MIPS

Technology: GSM/GPRS/EDGE

Interchangeable: Q2686

Data: GPRS Class 10, Class B & CSD 14.4

EDGE Class 10, Class B, MCS 1-9

Size: 40 x 32.2 x 3.9mm

Weight: <10g

Shielding: Fully shielded

On Board Memory: H : 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 Panasonic AXK600345J

3 RF Connections: Hirose 50Ω U.FL, IMP,

Solder pad for RG178 cable

Interfaces: USB 2.0 Slave, 2 x UART, 1 x Parallel

PCM (Digital Audio Interface)

2 x Analogue Audio (2 mic, 2 spkr)

2 x ADC (10bit, 0-2V, 216sps)

1 x DAC

Up to 44 GPIO

Buzzer output

2 x Interrupt

LED driver (PWM)

SIM: 3V & 1.8V

Keyboard: 5 x 5

Peripherals: Via SPI or I²C or parallel interface

(LCD, NAND)

TBD minimum

3.6V nominal

TBD maximum

Consumption: TBD μA (Off)

TBD mA (32KHz Mode)

TBD mA (Disconnected Mode)

TBD mA (Alarm Mode)

1.7A peak (Dedicated Mode)

Battery Charger: LiIon, 800mA maximum

BTC Backup: Via external battery

APPROVALS

Manufacturing: ISO TS 16949

Regulatory: R&TTE directive

CE marking

GCF-CC

FCC/PTCRB

China RTE

Carrier: Refer to website for latest list

www.wavecom.com/approvals

IMEI: Refer to service offer

QUALITY & ENVIRONMENTAL

Quality reliability objective:

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*

M2M413: Open AT® + Orange M2M Connect*

M2M415: M2M410 + Bluetooth Plug-In

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)

