WAVECOM

Smart wireless. Smart business.

Wireless CPU

Q26 FAMILY

Smart Devices   **Creative Software**   **Services**

OPEN AT

Q26 FAMILY Wireless CPU®s

The Q26 family of Wireless CPU®s is a range of programmable processors with wireless communication capabilities, designed for wireless M2M (machine-to-machine) communication.

Choose between GSM/GPRS, EDGE, WCDMA, HSxPA and CDMA 2000 1x versions – all with a common form factor.

Processor with built-in wireless

Remote monitoring and upgrade

Form factor compatibility

High-speed data transmission

Software designed for M2M

Q26 FAMILY

Q26 Extreme

The dual-mode 2G/3G Q26 Extreme supports peak data rates up to 7.2 Mbps HSDPA and 2 Mbps HSUPA with automated 2G/3G handover.

Q26 Elite

The Q26 Elite features the Qualcomm QSC6055 chipset and integrate Qualcomm gpsOne® technology, making it uniquely suited for fleet management and tracking applications.

Q2687

The Q2687 supports a new parallel data bus for interfacing to displays and external memory as well as data bearers up to EDGE. It is certified for use in the North American market.

Q2687 Classic

Q2687 Classic is an entry level version of the Q2687, certified for use in the North American markets. It supports GPRS and has exactly the same IO features as Q2687.

Q2686

Equipped with on-board audio recording facilities, the Q2686 is well suited for alarm systems and IVR (Interactive Voice Response) product design.

Smart Devices

A single form factor for multiple technologies

Conceived for rapid mounting on printed circuit boards, the Q26 family of Wireless CPU®s allows you to make one single product design which can communicate on any cellular protocol, anywhere around the world.

One footprint

All Q26 Wireless CPU®s are footprint compatible in order to smooth product development and simplify the process of upgrading. External or embedded applications written for Q2686 or Q2687 Wireless CPU® devices are fully portable, without additional software coding, to the Q26 Extreme, thanks to the smart Open AT® operating system.

Scalable platform

All Wavecom products can be used as simple wireless modems. Some of them can be used as smart modems, sharing system load. But to offer you the ultimate competitive advantage, most of them also allow you to embed your software application on the powerful AMR9 core of the Wireless CPU® itself, cutting material costs to the bone.

Quality and environment

All Wavecom Wireless CPU®s comply with the European Union's RoHS (Restriction of Hazardous Substances) directive (EU Directive 2002/95/EG). They are manufactured by an ISO/TS 16949-certified OEM, and Wavecom has also adopted this standard as a management system model and interpreted its requirements for our organization.

Smart Devices

Choose a Q26 family Wireless CPU® when you need one or more of the following:

• **Programmable capabilities***
• **Small size**
• **Multi-standard wireless**
• **Future proof bearer evolution**
• **A field replaceable product**

↗ The **Q26 Extreme** is equipped with antenna diversity and runs at peak data rates up to 7.2 Mbps HSDPA and 2 Mbps HSUPA with automated 2G/3G handover. Q26 Extreme is the first dual-mode GSM, GPRS, EDGE, HSDPA

and HSUPA programmable Wireless CPU® in the world. The built in duo-core application processor provides dedicated application processing ARM9 power at up to 104 MHz, programmable in C and/or Lua.

↗ **Q26 Elite** features up-to-date CDMA technology and supports GPS, making it uniquely suited for fleet management and tracking applications with E911 requirements. In addition, it provides customers using CDMA an opportunity to upgrade as new technology becomes available.

Both Q26 Elite and Q26 Extreme are automotive grade products, meeting some of the toughest quality requirements in the industry.

↗ **Q2687** is backwards compatible with the Q2686, forwards compatible with 3G evolutions and their cellular software application development environments so that application portability is made easy. It also supports a new parallel data bus for interfacing to displays and external memory and data bearers up to EDGE (Q2687 Classic: GPRS).

↗ **Q2686** is an entry-level, cost-effective solution enabling you to start your development with a feature-rich GSM/GPRS solution which can easily be evolved to EDGE, 3G and 3.5G when required. Software options include companion GPS, aqLink® and security (SSL, jamming detection and local storage of encrypted data).

GSM versions only.

inSIM® - An end-to-end SIM solution for the M2M market

inSIM® is a fully industrialized and personalised SIM solution that removes the plastic from a conventional SIM card and physically embeds the resulting silicon die right inside a Wireless CPU®. 3GPP security is maintained while providing the ability to provide a Wireless CPU with a service subscription already loaded, all in an industrial grade product that withstands extremes of temperature, vibration & humidity.

Benefits:

• **SIM holder removed.** The SIM holder is causing operational issues linked to temperature range limitations and to module-SIM contact quality due to vibrations or humidity.

• **Simple SIM logistics process.** The current process requires a specific management of SIM deliveries, insertion into the application and personalisation handling. inSIM® removes complexity and cost from the deployment.

• **Miniaturization.** Many M2M applications require a high level of integration.

• **Anti-theft.** Having the SIM inside the Wireless CPU prevents any theft or misuse of the SIM

• **Operator compatibility and flexibility.** inSIM® is ready for any GSM operator with no modification of their personalization process. It is possible to change from operator by connecting an external plastic SIM card (internal switch). For more information, see www.wavecom.com/insim.

• **Warranty** of the full Wireless CPU® sub-system including the SIM.

	Q26 Extreme	Q26 Elite	Q2687/Q2687 Classic	Q2686
Market Positioning				
	Automotive	Generic / Automotive		Entry level
Cellular performances				
Bearers	GSM + GPRS multi slot class 12 EDGE (E-GPRS) multi slot Class 12 WCDMA HSPA	CDMA 1xRTT	GSM + GPRS class 10 EDGE (Q2687)	GSM + GPRS class 10
Radio Bands	Tri band UMTS/HSxPA (WCDMA/FDD), Quad Band GSM 850/1900/2100 MHz (band I, II, V) Quad band 850/900/1800/1900	Dual band 800/1900	Quad band 850/900/1800/1900	Quad band 850/900/1800/1900
Approvals	R&TTE, CE, GCF, FCC, PTCRB, China RTE, AT&T	FCC & IC CDG 1&2 Various Carrier Approvals	R&TTE, CE, GCF, FCC, PTCRB, China RTE, AT&T	R&TTE, CE, GCF, FCC, PTCRB, China RTE, AT&T
Nominal Sensitivity				
850 MHz Rx	-104 dBm	> -106 dBm	-104 dBm	-104 dBm
900 MHz Rx	-104 dBm	> -106 dBm	-104 dBm	-104 dBm
1800 MHz Rx	-104 dBm	> -106 dBm	-102 dBm	-102 dBm
1900 MHz Rx	-104 dBm	> 106 dBm	-102 dBm	-102 dBm
3G BAND I (2100 MHz)	-106.7 dBm			
3G BAND II (1900 MHz)	-106.7 dBm			
3G BAND V (800 MHz)	-106.7 dBm			
TX performances				
850 MHz Tx	+33 dBm (Class 4)		+33 dBm	+33 dBm
900 MHZ Tx	+33 dBm (Class 4)		+33 dBm	+33 dBm
1800 MHz Tx	+30 dBm (Class 1)		+30 dBm	+30 dBm
1900 MHz Tx	+30 dBm (Class 1)		+30 dBm	+30 dBm
3G BAND I (2100 MHz)	+24 dBm (Class 3)			
3G BAND II (1900 MHz)	+24 dBm (Class 3)			
3G BAND V (850 MHz)	+24 dBm (Class 3)			
Intellectual property rights (IPR)	Included	Included	Included	Included
Power consumption	Standby mode 400 µA Alarm mode 15 µA Idle mode 2.5 mA Full speed OS 30 mA Call GSM max power (2W) 2A peak GSM900 PCL5 450 mA Call GPRS max power (cl 10) 580 mA WCDMA max power 790 mA WCDMA 0 dBm 400 mA HSDPA max power 820 mA HSUPA max power 800 mA	Alarm min <2 mA Standby and Idle 136 mA Tx full power Maximum 600 mA	- 17 uA Sleep Mode - 1.7 mA Idle Mode - 400 mA GPRS Class10 (33dBm)	- 17 uA Sleep Mode - 1.7 mA Idle Mode - 400 mA GPRS Class10 (33 dBm)
CPU Performances				
Processor	ARM946 / DSP	ARM9	ARM946 / DSP	ARM946 / DSP
Core frequency (VariSpeed)	26-104 MHz	192 MHz (32 MHz)	26-104 MHz	26-104 MHz
User MIPS available (GSM stack active)	Up to 88 MIPS		Up to 88 MIPS	Up to 88 MIPS
Core/IO voltage	1.8 V core supply voltage 2.8 V PAD supply voltage	1V8-2V8	1V8-2V8	1V8-2V8
Audio				
Analog audio	2x Speakers and 2 Microphones	2 x speaker out / 2 x micro in	2x Speakers and 2 Microphones	2x Speakers and 2 Microphones
Digital audio	PCM digital interface (768 KHz 768 KHz (16bits data MSB first, Master)	1 x PCM	PCM digital interface (768 KHz 768 KHz (16bits data MSB first, Master)	PCM digital interface (768 KHz 768 KHz (16bits data MSB first, Master)
Codec	GSM : FR-EFR-HR-AMR W-CDMA : AMR	EVRC/QCELP/4GV (NB)	FR-EFR-HR-AMR	FR-EFR-HR-AMR
Quality	VDA2A		VDA2A	VDA2A
Echo Cancellation & noise reduction	√	√	√	√
DTMF	√	√	√	√
Interfaces				
UART	X2	2	2	2
USB	USB 2.0 Full Speed (12 Mbps)	Device 2.0 (Full speed)	2.0	2.0
SPI	2		2	2
I2C	1	1	1	1
ADC	2	2	2	2
DAC	1	1	1	1
GPIO	Up to 45 GPIO's (26 GPIO's 2.8V, 19 GPIO's 1V8)	Up to 20*	Up to 44	Up to 44
RTC	Yes	Yes		
Timers (HW, SW, Capture)	Yes	n/a		
Interrupts pins	3 external interrupt	n/a	2	2
Flash LED output		1		
PWM (Buzzer)	1	1		
Keyboard interface	5x5	5 x 5	5 x 5	5 x 5
SIM interface	SIM and U-SIM	RUIM	1.8V/3V	1.8V/3V
Parallel bus (through software API)	Yes (16 bits)	n/a	Yes (16 bits)	Yes (16 bits)
External memory support (Flash /RAM in Mbit)		n/a		
JTAG	No			
Miscellaneous				
Packaging	Module	Module		
Mechanical size	40 x 32 x 6.55	40 x 32.2 x 6.63 mm	40 x 32.2 x 4 mm	40 x 32.2 x 4 mm
Operational temperature				
Full specification	-20°C / +55°C Class A	-20°C / +55°C	-20°C / +55°C	-20°C / +55°C
Class B	-30°C / +75°C Class B -40°C / +85°C Storage	-40°C / +85°C	-40°C / +85°C	-40°C / +85°C
Quality grade	Automotive	Automotive		Automotive
RoHS	√	√	√	√
Shipment packaging	Boxed 100 pieces	Boxed 100 pieces	Boxed 100 pieces	Boxed 100 pieces

*1 Multiplexed, *2 with performance deviations

Creative Software

Industrial software for industrial design demands

The Open AT® Software Suite allows you to develop, compile, test, debug, download and natively execute your applications written in standard ANSI C and/or Lua directly on your Q26 Wireless CPU®. It is royalty-free and comprises operating system, compiler and integrated development environments. There are no hidden costs - maintenance and qualification are provided for free by Wavecom.

- ○ Multitasked Pre-Emptive Event-Based Real-Time Operating System
- ○ Integrated Development Environment built on Eclipse™
- ○ Extensive Set of Plug-Ins (Internet Suite, C-GPS and more)
- ○ GSM Release 99 compliant modem firmware
- ○ Secure Intelligent Device Services (IDS) compatible

Real Time Operating System

The Open AT® Operating System is a pre-emptive, multitasking real-time operating system that combines the wireless communications function with core embedded programming capability. It allows developers to natively execute their ANSI C based programs with a minimum memory footprint and processor resource overhead.

↗ **Real-Time**

Guaranted response time to inter-ruption (even during GSM/GPRS activities, calls and transfer).

↗ **Wireless CPU® Resources Direct Access and IT Management**

- • Hardware and Software Timers
- • DSP
- • SPI
- • ADC
- • External Interrupt Pins
- • GPIOs
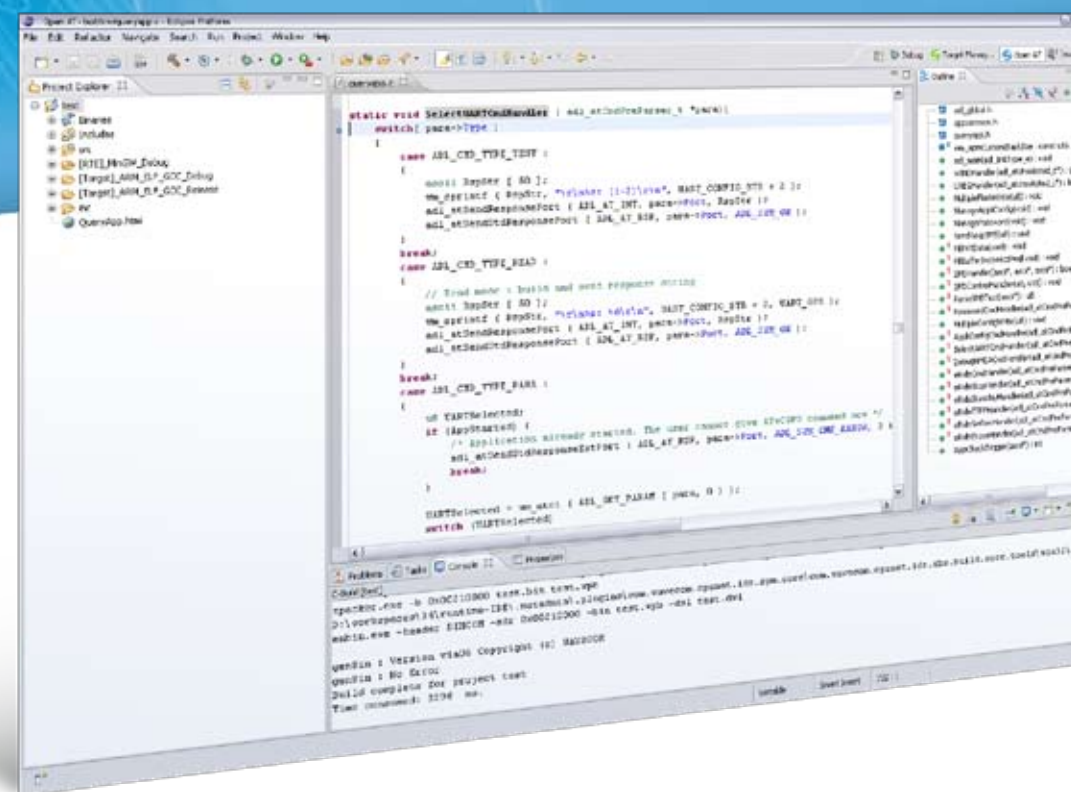- • UARTS

↗ **Multitasking**
- • Up to 64 tasks in parallel

↗ **Auto shut-down feature**

Feature improving the overall consumption of the application by deactivating the RS232 interface.

↗ **Application dedicated Hardware Watchdog**

- • Application dedicated for close monitoring
- • Tunable depending on the complexity of the processing (ex: Pulse count Vs RSA signature calculation…)

Integrated Development Environment

Built on the de-facto standard Eclipse™, offered for free, the Open AT® Integrated Development environment manages all the development steps of your project. It enables you to code in C and/or Lua, create multi-build configurations by project, compile, download, debug wireless applications that are run directly on the Wireless CPU of your choice. It allows also project versioning and work in team environment.

Wavecom provides a comprehensive set of high-level programming interfaces (as of today more than 450) known as Open AT® APIs in order to simplify development. Once the application coding is finalized, it can be compiled using a free compiler GCC that is linked with the Open AT® API library, and then downloaded to the Wireless CPU.

Debugging tool set

The IDE includes a set of powerful and configurable trace tools:
- • Target Monitoring Tool for displaying debug traces sent by an Open AT® application
- • Terminal Emulator: AT commands serial link terminal
- • Remote Task Environment allowing the execution of an Open AT® application from a PC, while communicating with the Target software through a serial link
- • JTAG support

Quick and easy end-to-end development

With the M2M Developer Suite from Anyware Technologies, you can use a single IDE to create both the client and server side applications without needing any code programming software skills.
See www.anyware-tech.com for more information.

BUILT ON eclipse

A fully Eclipse-based integrated development environment

The new Open AT® IDE v2 is based on Eclipse Ganymede and brings you a lot of new features and advantages which will make the development, debugging, testing, compilation and download of your application an enjoyable experience.

Key benefits:
- *• A familiar environment for many developers*
- *• Fully integrates all Wavecom tools as Eclipse plug-ins*
- *• Automatic update checker with pop-up notification*
- *• Non-proprietary, built on an open source framework*
- *• Multi-platform execution*

OPEN AT **Creative Software**

Seamlessly Plug-In additional features

Plug-Ins are an optional range of software feature packages that are selected when your order your Wireless CPU®. The standard range provid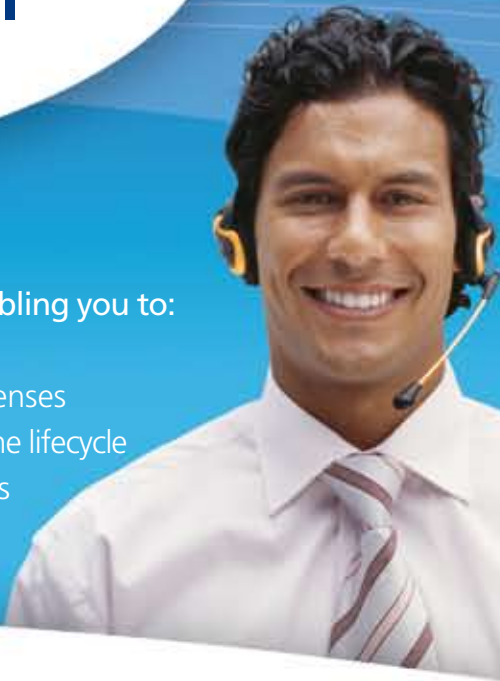es access to Internet clients and protocols, and to controllerless companion wireless peripherals such as Bluetooth and GPS.

Of course, the powerful flexibility of Open AT® Software Suite means that you can also develop your own Plug-Ins and own custom AT commands.

Lua Easy Scripting

C-GPS Companion

aqLink In-band modem

Security

C-Bluetooth™ Companion

Internet Clients & Protocols

Professional services

Wavecom professional services: less pain, more gain

Wavecom proposes an extensive professional services offering, enabling you to:
- Ensure a high degree of solution stability and performance
- Avoid deployment errors that could result in delays and added expenses
- Minimize time-consuming redesign by ensuring proper design early in the lifecycle
- Avoid common issues and expedite the resolution of critical problems
- Work on a safe design to integrate Wavecom products

New functionalities, quickly and easily

↗ **TCP/IP Plug-In**
The basic building blocks to create a wireless Internet connected product.

↗ **Internet Plug-In**
Includes the functionality of the TCP/IP Plug-In and extends it to include email (POP3/SMTP) and file transfer (FTP) clients.

↗ **Security Plug-In**
Add end-to-end security with SSL, act on jamming attacks, and store data securely.

↗ **Lua Scripting Language Plug-In**
Lua simplifies application development by taking care of such tasks as memory, data flow, and control flow management.

↗ **Companion GPS Plug-In**
C-GPS is an optimised host base solution for geo-location, making your product smaller, cheaper and more powerful.

↗ **Companion Bluetooth® Plug-In**
With the addition of a reduced functionality controllerless (no microprocessor) chipset, you can realize a complete Bluetooth system.

↗ **aqLink® Plug-In**
aqLink® enables the delivery of critical data through any GSM network: 22 bytes in less than 1.5s through the voice channel.

	Q26 Extreme	Q2687/Q2687 Classic	Q2686
Plug-Ins			
TCP/IP (Socket layer, UPD, TCP)	√	√	√
Internet (FTP, HTTP, SMTP, POP3, DNS, MMS)	√	√	√
Security (SSL, Jamming detection, crypto lib)	√	√	√
Bluetooth	√	√	√
C-GPS (inc. Dead Recogning)	√	√	√
C-CAN	√	√	√
Scripting language	LUA standard (open source)	LUA standard (open source)	LUA standard (open source)
Graphic library	√	√ (sample)	√
In-band modem	√	√	√
Download over the Air (DOTA)	√	√	√
Type I, Type II, IDS	Mutual authentication, OMA-DM1.2	Mutual authentication, OMA-DM1.2	Mutual authentication, OMA-DM1.2
Development Environment			
C Compiler	√	√	√
Remote task Env	√	√	√
Traces	√	√	√
Break Point	√	√	√

The Q26 Elite is not compatible with the Open AT® Software Suite.

Wavecom University

Open AT® developer courses
Wavecom University is our professional education program. Learn how to make the most of the Open AT® Software Suite and speed development time!

Product design and certification

↗ **Application code review**
Wavecom offers to perform a code review of your Open AT® Application. Our Open AT® experts review your C application and generate a comprehensive Code Review Report under strict confidentiality.

↗ **Customer design review**
The Customer Design Review Service helps you to integrate Wavecom's products into your device by benefiting from design best practices and Wavecom's own wireless expertise.

↗ **Customer product certification**
Wavecom's unique global experience in final product certification management is at your service for safety related certifications (CE, FCC, CCC) and/or GSM related certifications (GCF-CC, PTCRB).

Product build

IMEI implementation
- *Preloaded Customer IMEI:* Apply for your private range of IMEI numbers and Wavecom can download them in your Wireless CPU® prior to delivery.
- *Wavecom IMEI:* Wavecom proposes a valid IMEI number embedded within the Wireless CPU®. You share the Wavecom IMEI TAC number with other Wavecom customers.
- *Inactive IMEI:* This offer will allow you to download your IMEI numbers at your premises.

Tailored delivery
- *Express Delivery:* A limited amount of Wireless CPU® can be delivered world wide in less than 7 working days to enable you to perform unexpected sales.
- *Fast Delivery:* All orders of Wireless CPUs® can be delivered in less than 21 calendar days without limitation on the quantities.

Tailored product configuration
Our Tailored Product Configuration service gives you the opportunity to customize some of the configurations that are shipped from the factory by Wavecom.

After sales

↗ **Wireless CPU® reconfiguration**
This service gives you the opportunity to reconfigure your Wireless CPU® after sale.

↗ **Out of warranty repair**
You can request this service to repair your Wireless CPU® devices which are out of warranty.

↗ **Extended warranty**
Wavecom proposes 1 year, 2 years or 4 years warranty extension, added to the normal 1 year warranty.

Operated services

An end-to-end turn-key solution, reliable, secure and cost effective
===

Do you need to enhance the quality of your service, and shorten response time to your customers, while reducing support costs and saving money on your field maintenance? Wavecom Intelligent Device Services provide a rapid and reliable answer to your concerns.

Enrich your products & services, reduce your costs

Life cycle expectations for cellular-equipped telematics and machine-to-machine products are increasing in fast paced business environments. This directly results in a dramatic increase of post-deployment field maintenance costs.

Wavecom has created the world's first cellular operated service portfolio for you to benefit from easy to use end-to-end Intelligent Device Services (IDS) that enable you to sleep at night. When choosing Wavecom, you can relax in the knowledge that no matter what happens, we can remotely monitor and securely upgrade the application software of your product in addition to the entire Wavecom embedded Open AT® Software.

End-to-end turn-key solution

All GSM Wireless CPU devices are IDS compatible and the service can be used any time, anywhere.
There is no need for you to develop nor invest in any new back-end system, we take care of everything for you.

Cost effective solution

Benefiting from the latest software differential generation technology, you can free up memory for your application while reducing data traffic volume by upgrading only the parts that have changed, either in your software or in the entire Wavecom embedded Open AT® Software.

Reliable and secure end-to-end system

Wavecom has built its IDS system on a powerful, field-proven, OMA-DM client-server software suite developed for mass wireless deployment and has enhanced the security between devices and the Wavecom Device Management Server by an authentication mechanism already pre-installed in the Wireless CPU.
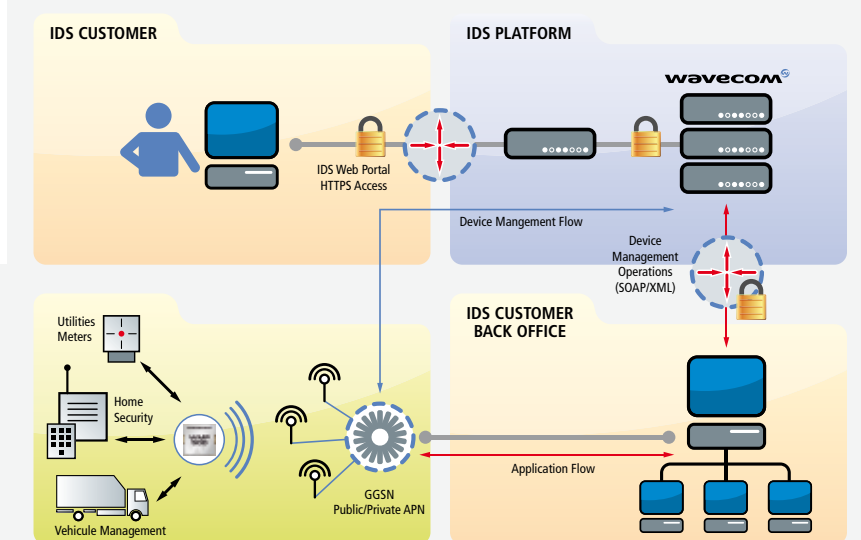
Easy and secure access to IDS back end

Interconnect your Information System with the Wavecom Back-End system via our web services interface or access via our web portal in a secure manner, and manage in real-time any remote operation status on any of your products round the clock, 24/7/365.

IDS is not available for Q26 Elite.

Telematics and machine-to-machine cellular equipped product life cycle expectations are increasing in fast paced business environments. This directly results in a dramatic increase of post-deployment field mainte-nance costs. Wavecom has created the World's first cellular operated service portfolio to benefit from easy to use end-to-end Intelligent Device Services that enable to remotely monitor and securely upgrade the application software of your product in addition to the entire Wavecom embedded Open AT® Software.

Why use IDS?
• To reduce your technician dispatch by being able to configure and monitor remotely your devices.
• To increase your device uptime by getting device failure alerts that notify in real-time that a critical event is likely to occur.

Set up a FREE IDS trial account

Ask for a free (IDS) trial account to use Intelligent Device Services on http://www.wavecomservices.com. The trial is set up for 3 months for 100 devices. The trial can be perfor-med during your product development phase, but also at an early stage of field deployment. After 3 months of trials, you are free to decide to go for commercial subscription or not.

See for yourself the benefits of instant IDS access by e-mailing us at wavecomservices@wavecom.com to receive your IDS access.

Online services
• On-demand Device Monitoring
• Real-time Device Diagnosis
• Traffic Usage Reporting
• Delta Software Generation Service
• Download Campaign Monitoring

IDS secure architecture

IDS CUSTOMER

IDS PLATFORM

IDS Web Portal HTTPS Access

Device Mangement Flow

Device Management Operations (SOAP/XML)

IDS CUSTOMER BACK OFFICE

Utilities Meters

Home Security

Vehicule Management

GGSN Public/Private APN
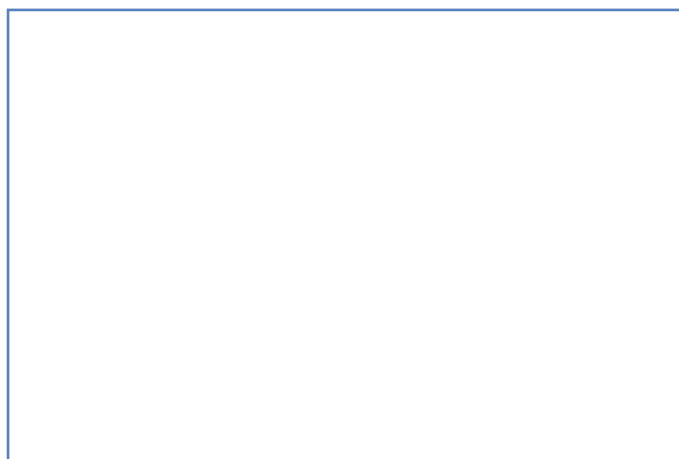
Application Flow

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Q26 Family: *www.wavecom.com/q26*

inSIM® solutions: *www.wavecom.com/insim*

Developer Forum: *www.wavecom.com/forum*

Intelligent Device Services portal: *www.wavecomservices.com*

Wavecom SA - 3, esplanade du Foncet - 92442 Issy-les-Moulineaux Cedex - France
Tel: +33 (0)1 46 29 08 00 - Fax: +33 (0)1 46 29 08 08

Wavecom, Inc. - 430 Davis Drive, Suite 300 - P.O. Box 13920 - Research Triangle Park, North Carolina - USA
Tel: +1 919 237 4000 - Fax: +1 919 237 4140

Wavecom Asia Pacific Limited - Unit 201 – 207, Second Floor, Bio-Informatics Centre - No. 2 Science Park West Avenue
Hong Kong Science Park, Shatin - New Territories, Hong Kong - Tel: +852 2824 0254 - Fax: +852 2824 0255