Capture. Connect. Decide.

Tempus ALS

Tempus ALS

Empowering a **new approach** to emergency response.

Imagine not having to carry a 20 lb+ (8–15 kg) monitor to scene. With Tempus ALS you don't need to.

Tempus ALS is a new, modern approach to prehospital monitoring and defibrillation. Designed to empower caregivers to focus on the patient and not be distracted or burdened by the equipment they need to use, the Tempus ALS system is comprised of a Tempus Pro monitor and a Tempus LS professional defibrillator.[1]

Each device can be used to perform its monitoring or therapy functions separately — but devices connect wirelessly when together to share data. With two systems working as one, Tempus ALS provides a unique solution for emergency medical providers.

The Tempus Pro can be carried on a shoulder strap, while the Tempus LS can live in a medical response bag, only taking up a small amount of space. This allows you access to the features you need to use, while helping reduce potential risks associated with carrying bulky equipment to scene.

Offering handling benefits whilst keeping your critical therapy device protected and always on-hand, the Tempus ALS provides a powerful system, that can be deployed across various emergency response vehicles.

In use, the Tempus ALS' dual-screens allow for greater visibility. In resuscitation cases one display is focused on defibrillation therapy and the other on patient monitoring, while additional data entry opportunities help capture rich event-driven data.

With reliable transmission, data can be viewed in a user-friendly format throughout the patient journey without the need for additional software on a PC, tablet or smartphone.[2]

Using exclusive data communication technologies, Tempus ALS allows for real-time streaming of vitals, waveforms and images to Philips IntelliSpace Corsium web-based clinical dashboards.

Designed with powerful security protocols, Tempus ALS with IntelliSpace Corsium data management provide interactive ECG measurement, diagnosis and two-way communication.

Seamless electronic Patient Care Record (ePCR) integration supports improved accuracy of records and handovers. Clinical and operational dashboards and over the air updates can simplify and support scalable deployment and utilization.

The Tempus ALS, although small, is highly robust and packed with all the functionality you need.

Tempus ALS

Advanced monitoring and resuscitation in a compact, **modular** form-factor.

Tempus Pro
Monitor

With its user-friendly layout, the 6.4 lb (2.9 kg) monitor provides a range of monitoring parameters and features, including[9]: 12-Lead ECG to monitor, arrhythmia, ST elevation and QT segment with alarms, capnography, NIBP and up to four lines of invasive pressure, Masimo SpO_2 (SpHb, SpMet, SpCO, SpOC available), up to 2-lines of temperature, at least 10 hours and 45 minutes Li-Ion Battery with a display brightness of 60%, 6.5" touch screen high contrast and NVG capable, IP66 rating, fully-integrated wired and wireless communications (Wi-Fi, 3G/4G, Bluetooth, Cat5) and 110 mm printer[5], integrated on-board camera, plug-in ultrasound and video laryngoscopy as extra features, customizable, integrated Summary Record of Care that can be integrated in to an ePCR, shared via email or exported to a USB and secure, real-time data transmission even when communications are poor.[2]

Tempus LS
Defibrillator

Small enough to live in a medical response bag, Tempus LS defibrillator with manual defibrillation, weights just 4.3 lb (2.0 kg).[9] It features a small Li-Ion battery capable of delivering 300 shocks at 200 J or at least 11.5 hours of ECG monitoring with display brightness at 30%, IP66 rating, real-time CPR rate and depth measurements with audible and on-screen prompts, 3-, 4-Lead wire ECG monitoring, fixed and demand mode pacing, synchronized cardioversion and proven 200 J Biphasic Truncated Exponential (BTE) waveform.

~3 kg

~2 kg

Tempus ALS

A platform for growth.

Advanced capabilities to enable a more clear and documented decision making.

The Tempus ALS was designed with growth in mind to accommodate your needs and budget. By adopting universal technology standards and connectors, the Tempus ALS is built to grow flexibly as your needs change.
USB and wireless interfaces allow for expanded monitoring and diagnostics, without having to carry separate devices, such as a video laryngoscope or an ultrasound device and displays.
Moreover, the proprietary communication technologies mean data can be stored, viewed and shared in alternative ways.

Ultrasound and vascular examinations.

An optional plug-in ultrasound transducer can be used to extend the capabilities of the Tempus Pro platform to provide basic ultrasound assessment when a detailed, high quality image is not required.

· 3.5 MHz ultrasound probe for general purpose
· 7.5 MHz ultrasound probe for line placement and vascular examinations
· Automatic creation of a FAST exam report for automatic inclusion in the record of care[11]
· FAST exam report can be transmitted in real-time or post event

Video Laryngoscopy.

An optional plug in Karl Storz-C-MAC® video laryngoscope imager can be used to give video laryngoscopy support during airway management.

· A range of disposable Macintosh and D-blades are available to enable video laryngoscope images to be visualised on the Tempus Pro display
· View vitals, including capnography and SpO_2 while intubating the patient
· Still images can be captured and automatically included in the record of care
· Still images can be transmitted in real-time or post event

Philips IntelliSpace Corsium

Real-time rich data transfer and two-way communication to empower clinical decision.

Benefits

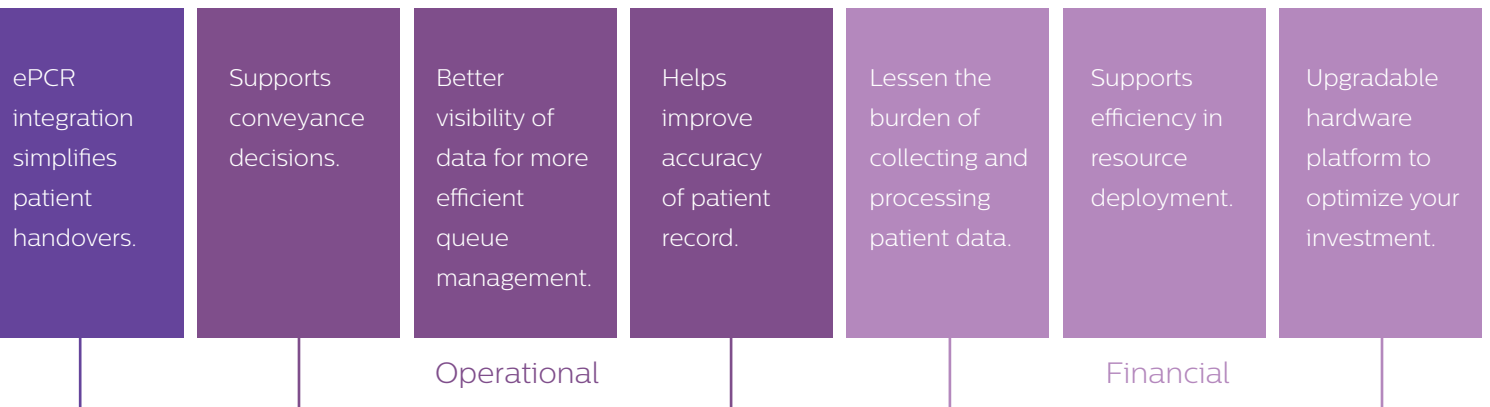| Supports confident on-site diagnosis.	Contributes to improved patient contact and experience.

Clinical

Philips IntelliSpace Corsium is a web-based software platform that unlocks the power of the Tempus ALS. With the ability to capture rich levels of on-scene clinical and patient data, IntelliSpace Corsium allows Tempus ALS users to quickly share data and collaborate.

Using proprietary encryption and data transmission technologies, rich event-driven clinical data, including vitals and images, can be securely shared in real-time and reviewed for two-way consultation, enabling rapid clinical and transport decision support and seamless ePCR integration.

| ePCR integration simplifies patient handovers. | Supports conveyance decisions. | Better visibility of data for more efficient queue management. | Helps improve accuracy of patient record. | Lessen the burden of collecting and processing patient data. | Supports efficiency in resource deployment. | Upgradable hardware platform to optimize your investment. |

Operational

Financial

Philips IntelliSpace Corsium

Adding an extra layer of **confidence** around clinical decision making.

You are expected to make important decisions every day, every minute. Whether you're a field medic seeking medical guidance, an operations manager deploying equipment across a system or a medical director understanding a clinical challenge, IntelliSpace Corsium is here to support your clinical decisions with rich data and clear guidance.

Meet increasing demand

Transport to specialized or primary care

Key patient physiological and event data is real-time

Empower clinical decision making

Optimize and streamline patient care

Measure quality of care

Event synchronized physiological data

Over the air configuration

Handover and ePCR integration are seamless

Tempus ALS & IntelliSpace Corsium

Multiple benefits for different stakeholders.

Challenges

Manual handling issues - Equipment carried on-scene is heavy.

Clinical decision support — limited data transmitted for on-scene support.

Reliability - Equipment is damaged as used in unpredictable conditions.

Clinical decision making - A lot to do on-scene, limited time/capacity to deliver optimal care and complete records.

Governance - Record keeping can be inaccurate and documented post-event.

Data and Connectivity - Unreliable data transmission and comms.

Workflow - Patient handover can be a lengthy process.

Standardization — Need to have a standard of care across all responder vehicle types.

Tempus ALS & IntelliSpace Corsium solution

Modular system: 6.4 lb (2.9 kg) monitor for shoulder carry and 4.3 lb (1.95 kg) professional defibrillator in a medical response bag, only taking up a small amount of space[9].

Rich, event-driven data collected, time-synchronized to patient physiological data. Secure two-way transmission enables quick review and decision support. Ability to extend the capabilities to plug in USB and video laryngoscopy.

The Tempus Pro is IP66 rated and tested to high durability standards. It is the monitor of choice for a number of militaries across the globe, including much of NATO, with reputation for reliability and robustness. Tempus LS is small enough to live in a medical response bag, where it remains until required and connects wirelessly with the Tempus Pro when in use.

Time-synchronized physiological data is collected automatically and augmented with manual event-driven data collected directly on the monitor. All data can be streamed directly via a web browser for quick review and in to ePCR. No double documentation needed. When using in resuscitation cases, one display is focused on defibrillation (Tempus LS) therapy and the other on patient monitoring (Tempus Pro), limiting visual noise and improving visualization of events – enables a caregiver to focus precisely on the care with minimal distraction. All resuscitation data is automatically captured, transmitted and easily exported in to ePCR.

Tempus ALS provides automated data collection, which is time-synchronized with events and patient physiological data. This is coupled with manual event-driven data collection.
All timestamped resuscitation data can also be automatically streamed into optional IntelliSpace Corsium for analysis and review.

Tempus ALS enables rich data transmission and encryption. Our data platform has been developed and tested in conjunction with military.

The Summary Record of Care (SRoC) can be automatically flowed in to an ePCR with the IntelliSpace Corsium software. On-scene data and an accurate real-time view of patient status can be monitored directly in the Emergency Department.

The Tempus ALS can be deployed in to any emergency vehicle and medical response bag. Over the air updates and web-based data review can minimize operational down time.

Specifications

Tempus ALS is a small, fully-featured biphasic defibrillator/monitor, designed to enable prehospital caregivers to deliver care more efficiently:

· Full range of vital signs monitoring parameters with manual, AED, synchronized cardioversion and pacing in a small, highly robust package
· Utilizes the widely used, low energy 200 J biphasic BTE waveform
· Small enough to enable new choices in transport and deployment
· Long battery life - 10 ¾ hour of monitoring with display at 60% brightness (Tempus Pro) and 300 shocks with maximum energy (Tempus LS)
· Water and solid object ingress protection for austere environments with rating of IP66 (monitor and defibrillator)
· Plug-in sensor allows real-time CPR measurement & feedback
· Enables the capture of all vital signs, images and electronic records in an easy to use format that can be easily transmitted or shared with other devices and systems
· Fully integrated communications capability enables the transmission of all medical and vital signs data in real time[6]
· Large color display with multiple waveform configurations and large numeric view
· Displays ultrasound and video laryngoscopy images on the large color display utilizing third party ultrasound probes and video laryngoscopy accessories[5]

Control Interface
· Defibrillator interface is via clearly labelled buttons
· Monitor user interface is provided by a touch screen and simple graphically labelled buttons
· Drugs, fluids, therapies and interventions quickly added to the patient record through the Event button

Monitor Alarms
· User configurable visual and audible alarms
· Adult, pediatric and neonate settings
· Adjustable alarms ≤85 dBA at 1m
· 360° alarm visible indicator lights

Display
· Defibrillator – color 145 mm (5.7"), 640x480 pixels
· Monitor - color 165 mm (6.5") 640x480 pixels, 130 klux daylight readable display
· Multiple user-selectable display formats
· High-contrast mode, NVG compatible

Printer[5]
· High resolution 113 mm (4") integrated thermal printer

On-Screen Trends & Events
· Graphical and tabular format for all vital signs parameters
· Summary record of care of drugs, fluids, therapies and interventions provided

Tempus LS[1]

Manual Defibrillation
· Biphasic Truncated Exponential (BTE) waveform for defibrillation and synchronized cardioversion
· 1-200 J user configurable energy levels (1-10, 15, 20, 30, 50, 70, 90, 100, 120, 150, 170 & 200 J)
· Adult and pediatric modes available
· Charge time: 9 seconds to 200 J from first charge
· Time to shock from cold start-up: <15 seconds to 200 J
· Disposable adult and child pads

AED
· Indicated for coarse and fine VF & VT with a patient impedance of 25-250 Ω
· Analyse time: 9 seconds
· Mains filter: 50/60 Hz or OFF
· AED algorithm: > 90% sensitivity
· AED protocol in accordance with AHA/ERC guidance

Defibrillator ECG Monitoring
· 1-Lead monitoring using pads or 3-Lead via Tempus Pro-compatible ECG cable
· Speed: 12.5 mm/sec, 25 mm/sec, 50 mm/sec
· Heart rate range: 15-300 beats per minute (bpm) ±5, Accuracy: ±10%
· 50/60 Hz mains filter

Defibrillator ETCO$_2$ Monitoring
· Remote display of ETCO$_2$ using data from Tempus Pro

Pacer
· Fixed and demand modes provided, overdrive feature
· 0-200 mA ±5 mA pulses
· 40-240 bpm ±1.5% range
· 20 ms pulse width ±5%

Synchronized Cardioversion
· Synchronizes to R wave markers displayed on-screen
· <60 ms from R wave peak
· Automatically reverts to asynchronous delivery after shock has been provided

CPR Feedback
· Optional plug-in-sensor provides on-screen feedback of compressions, rate, depth and quality
· Audible feedback and on-screen messaging is provided to ensure compliance to AHA/ERC guidelines
· AHA/ERC guideline settings can be updated through USB with a manufacturer provided software update

Tempus Pro

ECG Monitoring
· 3-, 4-, 5- and 12-Lead monitoring via standard snap-on electrodes with automatic leadset detection
· Heart rate range: 30-300 bpm
· 12-Lead acquisition[5] and 12-Lead interpretation
· Input impedance: >100 MΩ, Dynamic range: ±5 mV ac
· Accuracy: ±3%, DC offset: ±300 mV dc
· Frequency response: 0.05 Hz to 175 Hz ±3dB
· Acquisition Sample rate: 500 Hz
· Common mode rejection: 95 dB minimum, additional filters include mains, muscle and low and high pass
· Arrhythmia monitoring & alarms
· ST elevation and QT segment measurement with alarms[5]

Impedance Respiration
· Range: 3 - 150 RPM · Accuracy: ±2 RPM or ±2% whichever is greater

Pulse Oximetry

SpO$_2$
· Range: 1 – 100%
· Accuracy (adults/child): no motion or low perfusion ±2 digits 70-100%, motion ±3 digits 70-100%,
· Accuracy (neonate): motion, no motion and low perfusion ±3 digits 70-100%
· Signal strength indicator · Perfusion index: 0.02-20%
· Response: <1 second delay · Employs patented Masimo SET Rainbow technology · Uses comfortable, waterproof soft-tip sensor
· Pleth Variability Index (PVI)[5]

Pulse Rate
· Range: 25 – 239 bpm
· Accuracy (all ages): no motion ≤3 digits, motion ≤5 digits

Total Haemoglobin (SpHb g/dl)[5]
· Range 0 - 25 g/dl · Accuracy (adults/infants/pediatrics) 8 - 17 g/dL ± 1 g/dl

Methaemoglobin (SpMet)[5]
· Range 0 - 99.9% · Accuracy (adults/infants/pediatrics/neonates) 1 - 15% ± 1%

Carboxyhaemoglobin (SpCO)[5]
· Range 0 - 99.9% · Accuracy (adults/infants/pediatrics) 1 - 40% ± 3%

Total Oxygen Content (SpOC)[5]
· Range 0 – 35ml of O$_2$/dL of blood

Non-Invasive Blood Pressure
· Accuracy: ±3 mmHg or ±2% (whichever is greater)
· Adult range: 20 – 260 mmHg
· Pediatric range: 20 – 230 mmHg
· Neonate range: 20-130 mmHg
· Cuffs:neonate disposable sizes 1-5, infant, child, adult, large adult, thigh, cuff kit

Capnometry[5]

Respiration Rate
· Range: 1 - 149 Breaths Per Minute (BPM)
· Accuracy: 0-70 BPM ±1 BPM, 71-120 BPM ±2 BPM, 121-149 BPM ±3 BPM

Microstream ETCO$_2$
· Range: 0 – 150 mmHg
· Flow rate: 50 (42.5 ≤ flow ≤ 65) ml/min, flow measured by volume
· Uses Oridion Microstream™ technology
· Accuracy: 0-38 mmHg ±2 mmHg, 39-150 mmHg ±5% of reading +0.08% per 1 mmHg over 38 mmHg

Contact Temperature
· 2 channel YSI 400 series compatible[7]
· Measurement range: 20 - 45 °C/68 - 113 °F
· Resolution: ±0.1 °C/±0.2 °F, Accuracy: ±0.1 ºC

Invasive Pressure[5]
· 2 channels, 5 µV/V/mmHg, Response: 0-20 Hz (-3 dB)
· Filters: 50-60 Hz notch, Range: -99 – 310 mmHg
· Expandable up to 4 channels via USB module[5]

Trauma Record – Summary Record of Care
· Unique, automatically-updating electronic trauma record
· User-friendly interface and completely configurable through separate PC application
· Semi-automatic patient record completion
· Operable with a gloved hand
· Record can be emailed or shared with any ePCR system through an easy to implement software development kit
· Record can be passed from device to device to accompany the patient through the echelons of care
· Data can be output as a PDF report
· Record can be streamed for real-time decision support

Integral Digital Camera
· Color 3.2M pixel camera
· Streams video using the H264 algorithm (bandwidth dependent)
· Images are included in the patient record

Ultrasound and Video Laryngoscopy[5]
· Optional Interson ultrasound probes general purpose 3.5 MHz and line placement 7.5 MHz
· Optional Karl Storz C-MAC video laryngoscope imager and single use blades

Anaesthetic Gas Monitoring[5]
· Optional Masimo ISA OR+ Anaesthetic Gas module for display of AA gas vitals

Battery & Power

Operating Time – Tempus LS
· At least 300 shocks at 200 J from a fully charged battery
· >12 hours ECG monitoring from a fully charged battery

Operating Time – Tempus Pro[8]
· At least 10 ¾ hours (display brightness at 60%, ECG, SpO$_2$, ETCO$_2$, temp x 2 and NIBP every 15 minutes)
· At least 11 ½ hours (display brightness at 30%, ECG, SpO$_2$, ETCO$_2$, temp x 2 and NIBP every 15 minutes)
· Up to 14 hours with battery saving mode activated[10]

Battery – Tempus LS and Tempus Pro
· Rechargeable, user replaceable lithium-ion battery
· Charge time: 3 hours to 90% [3,4]

Power Supply – Tempus LS and Tempus Pro
· Small size: 133 x 60.7 x 41 mm (5.24" x 2.39" x 1.62")
· Rated 100-240 V, 50-60Hz & 115 V 400 Hz 0.5 A
· Vehicle adaptor 11-27 V dc available[5]

External Charger[5]
· Optional external battery chargers

Physical Dimensions

Tempus LS
· Standalone size: 200 mm (7.9") wide x 164 (6.5") high x 72 (2.8") deep, cube 142" (excluding rear clip)
· Standalone weight: 2.0 kg (4.4 lb) nominal including battery

Tempus Pro
· Standalone size: 263 mm (10.3") wide x 216 mm (8.5") high x 100 mm (3.9") deep, cube 346"
· Standalone weight: 2.9 kg (6.4 lb) nominal including battery, excluding IP module, accessories and printer (with printer 3.2 kg (7 lb)

Environment – Tempus LS and Tempus Pro
· Operating temperature range: 0 ºC to 50 ºC
· Relative humidity: 15%-95% (non-condensing) operating and storage
· Altitude: -200 m to +5486 m (-656' to +18000')
· Storage temperature range: -37 ºC to +73.3 ºC
· Solid and liquid ingress protected to IP66 according IEC60529

Standards – Tempus LS and Tempus Pro
· Medical Electrical Equipment: IEC 60601-1-12
· Airborne equipment: RTCA DO-160G, 2010 section 21 cat. M
· Exceeds requirements of MIL-STD 810G 1.22 m (4') 26 drops all corners, edges and faces
· Crash Safety: 20 g per DO160E Sec 7.2 Type F
· Vibration: MIL-STD 810G rotary wing (UH-60 & CH-47), fixed wing (jet profile), fixed wing (turboprop profile), composite wheeled vehicle; Ground Vehicle per EN1789
· Operational shock: 45 g per MIL-STD 810G, 6 g per RTCA DO-160E

Mounts and Bags
· Hard transit cases and saddle bags available[5]
· Mechanical and electromechanical mounts compliant with ground and air (fixed and rotary wing) vehicles available[5]

Communications
· Low bandwidth system providing real-time medical data
· All voice, data and video communications are transmitted and stored using AES256 encryption
· Compatible with military IP-radios and satcoms

IntelliSpace Corsium licence options

Corsium ReachBak licence:[5]
· All medical monitoring data, vital signs, ECGs, Summary Record of Care and images are transmitted in real time
· Voice and video are transmitted in real time[12]
· Transmits 12-Lead ECG in real time and acquires 10 seconds of all 12-Leads
· Provides 12-Lead ECG analysis and measurement tools on the transmitted ECG
· ECG review results can be sent back to the Tempus Pro
· Tempus Pro operator can acknowledge ECG results and provide estimated time of arrival
· Images received from the Tempus can be annotated with text, colors, shapes and graphics which can be sent back to the Tempus Pro[12]

Corsium ECG licence:[5]
· Tempus Pro user can transmit 12-Lead ECGs
· Provides 12-Lead ECG analysis and measurement tools on the transmitted ECG

Integral Bluetooth
· Used for communication with the device's accessories
· Version: V2 EDR class 2 (monitor and defibrillator)
· Automatic data flow of code data from defibrillator to monitor

Integral USB
· 1 USB-A socket and 1 USB-B socket – defibrillator, 2 USB-A sockets – monitor
· For use with plug-in invasive pressure modules, CPR sensor, USB sticks, video laryngoscope, ultrasound probes etc.

Integral 3G/GSM Cell Phone
· Able to connect over 2G GPRS networks (GSM 850, EGSM 900, DCS 1800 & PCS 1900)
· Able to connect over 3G GPRS networks (UMTS 850/ Band V, UMTS 900/ Band VIII, UMTS 1900/ Band II & UMTS 2100/ Band I)

Integral Ethernet
· Compatible with Inmarsat, BGAN, V-SAT and other broadband communications systems
· Low bandwidth compatible (3 kbps) · LAN interface: 100Base-TX
· Connected via an RJ-45 connection
· Tempus Pro can connect direct to a radio or via an access point or router

Integral Wi-Fi
· 802.11b/g · Uses 128-bit encryption, WPA2 and WEP standards to ensure security · Smart Wi-Fi management allows the user to scan and connect to available networks

Voice Communications
· Compatible with military headsets (Peltor, Liberator etc.)
· Voice communication provided by an optional wired or wireless Bluetooth headset[6]
· Voice channel is full duplex with low bandwidth utilization (12 kbps)

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1. Tempus LS and Tempus LS-Manual are not approved for commercial distribution in the US. Tempus LS-Manual is pending 510(k).
2. Reliable data transmission (EDS) data is streamed automatically during the initial assessment and transport of the patient using Enhanced Data Service (EDS) protocol3. EDS is designed to ensure effective data transfer even when the underlying connectivity is poor or of low bandwidth.
3. Subject to conditions of storage and use, times are approximate.
4. Tempus switched off while charging, charging takes longer when the device is active.

5. Optional, additional feature.
6. Limitations apply and contract required with relevant service provider.
7. One channel fitted as standard second channel is optional.
8. Test done without printing.
9. Tempus Pro standalone weight: 6.4 lb (2.9 kg) nominal including battery, excluding IP module, accessories and printer. Tempus LS standalone weight: 4.3 lb (2.0 kg) nominal including battery.
10. Display active 50% of the time.
11. Not available in the US.
12. i2i ReachBak only

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