TECHNOLOGY SOLUTIONS UK LTD
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1166 *BLUETOOTH*® RUGGED RAIN RFID UHF READER

RAIN RFID

A Tough-Enough UHF RFID Reader

The new 1166 *Bluetooth*® Rugged UHF RFID reader from TSL® provides high performance UHF RFID reading in a tough and rugged form factor. The reader is highly resistant to water, dust and mechanical trauma. A high capacity battery enables non-stop operation of the reader over the full working day. Designed to read and write to EPC Class 1 Gen 2 (ISO18000-6C) tags, the 1166 can also be configured with class leading high performance 2D data scanning to bring unparalleled data collection capabilities to any host it is connected to.

Platform Independence

Use existing *Bluetooth*® wireless technology enabled[1] host devices including enterprise handhelds, consumer smartphones, tablets and PCs – the 1166 will bring high performance RFID and 2D scanning to all these devices running a wide range of Operating Systems.

Extensive software support is available for a wide range of platforms including code samples, demonstration applications and source code.

Batch Mode

Transponder EPC readings can optionally be stored on the embedded Micro SD card, meaning that the 1166 UHF RFID Reader can be used independently of a host device. The 1166 can store over 250 million* transponder EPCs - date and time stamped by the on-board Real Time Clock. The internal storage can be directly mounted in a Windows environment using the 1166 Docking Station Kit (separate purchase).

Speedy integration - ASCII 2 Protocol

The new 1166 Rugged *Bluetooth*® UHF RFID reader incorporates TSL's unique ASCII protocol for faster and easier application development. This sophisticated parameterised ASCII protocol provides the developer a powerful set of commands that carry out multiple actions locally within the reader. This approach enables multiple tag operations executed using simple pre-configured ASCII commands which not only speeds integration of the reader into applications but also abstracts the developer from some of the complexities of the underlying Native API and ultimately results in un-paralleled levels of performance.

Customise Your Solution

The choice of host device is yours - from low cost touchscreen MP3 players through to fully featured Enterprise Handheld Terminals. Devices can be mounted on top of the reader using an elegant push-lock adapter, enabling a one-piece solution.

Features:

High Performance *Bluetooth*® Multi-modal Data Capture

UHF RFID and 2D barcode data capture in one integrated *Bluetooth*® device.

Hardware Platform Independence

Operates with wide variety of *Bluetooth*® wireless technology enabled host devices including enterprise handhelds, consumer smartphones, tablets and PCs.

OS Independence

Operates with iOS, Windows Mobile, Windows Phone 8, WinCE, Windows 10/8/7/Vista/XP and Android™.

Batch Mode Operation

Real time clock for extended batch data collection independent of host connection. Store millions of tags and barcodes with date and time stamping

High Performance barcode scanning

A range of optional barcode engines can be specified to provide 2D data capture up to 15m

Made for iPod iPhone iPad

Bluetooth®

* For units manufactured in August 2020 onwards.

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1166 SPECIFICATIONS*

*These specifications only apply to TSL 1166 Readers with serial numbers higher than 7000.

Physical and Environmental Characteristics

Dimensions:	178.7 x 107.3 x 173.1 mm (LxWxH).
Weight:	865 g / 30.5 oz (including battery).
User input:	Single stage trigger.
User feedback:	Speaker, vibration motor, LEDs.
Power:	Removable, rechargeable 10.8V, 3350mAh, 36.2Wh Lithium Ion battery pack.
Minimum operating time[1]:	Light use[2]: 25 hrs Moderate use[3]: 16.5 hrs Heavy use[4]: 8 hrs
Enclosure materials:	Polycarbonate and TPU.

Performance Characteristics

RFID engine:	TSL® custom module with embedded Impinj R2000.
Communication protocols:	TSL® ASCII 2.0 parameterised command set.
Memory:	Embedded 16GB* NAND storage card - store up to 250 million date and time stamped EPCs * For units manufactured in August 2020 onwards. Units sold before this time will have 4GB or 8GB of storage.
Compatible Host devices (*Bluetooth*®):	Any *Bluetooth*® Host[5] supporting the Serial Port Profile (SPP) or Human Interface Device (HID) profile (Android, iOS, Linux, Mac, Windows). Comparison of *Bluetooth*® modes for TSL® UHF Readers.
Compatible Host devices (USB):	Any USB host with FTDI VCP driver support (Windows, Linux, Mac, Android).

Environmental

Operating Temp.:	-10°C to 50°C (14°F to 122°F).
Charging Temp.:	5°C to 40°C (41°F to 104°F).
Storage Temp.:	Less than 1 month at at -20 to +60°C (-4°F to 140°F). Less than 3 months at -20°C to +45°C (-4°F to 113°F). Less than 1 year at -20°C to +20°C (-4°F to 68°F).
Humidity:	5% to 85% non-condensing.
Drop Spec:	1.8 m.
Tumble:	1500 0.5 metre tumbles at room temperature (3,000 cycles).
Environmental Sealing:	IP67*.
Electrostatic Discharge (ESD):	± 15kVdc air discharge; ± 8kVdc contact discharge.
MIL-STD 810F:	Meets and exceeds applicable MIL-STD 810F for drop, tumble and sealing.

RFID Performance

Standards supported:	EPC Class 1 Gen 2 and EPC C1G2 (TBD).
Nominal read range[6]:	Up to 9 m (29.5 ft).
Field:	110-degree forward facing (approx.) measured from front of device.
Antenna:	Circularly Polarized.
Frequency Range:	EU: 865-868MHz; US: 902-928MHz.
Maximum Output Power:	Up to 30 dBm (region dependent) + 4.0 dBiC Antenna

*Please note; that this IP rating only applies to units with serials numbers ending in -000800 or higher

Barcode Scanning

Optional 2D Barcode Engine:	Optional TSL® custom 2D Barcode Scan Engine module.
Sensor Resolution:	1280 x 960 pixels, rolling shutter
Field of View:	Horizontal: 44.5°, vertical: 33.5°
Focal Distance:	From front of engine: 15.24 cm (6 in.)
Aiming LED:	Green LED
Illumination:	1 warm white LED
Symbologies Supported:	1D: All major codes 2D: PDF417, MicroPDF417, Composite, RSS, TLC-39, Datamatrix, QR code, Micro QR code, Aztec, MaxiCode Postal Codes: US PostNet, US Planet, UK Postal, Australian Postal, Japan Postal, Dutch Postal (KIX).

Ranges[7]:

Barcode	Near	Far
5 mil Code 39	6.1 cm	24.1 cm
5 mil Code 128	7.1 cm	22.9 cm
6.67 mil PDF 417	6.1 cm	20.3 cm
10 mil DataMatrix	7.4 cm	21.6 cm
100% UPCA	4.6 cm	49.5 cm
15 mil QR	3.0 cm	29.2 cm
20 mil QR	3.0 cm	35.6 cm

Communication

Bluetooth®:	*Bluetooth*® Version 2.1.
Bluetooth® Frequency Range:	2.4 - 2.4835 GHz.
Bluetooth® Profiles:	SPP Profile. HID Profile. Apple iAP.
Bluetooth® Power:	Class 2.
Bluetooth® Range[8]:	30m.
Bluetooth® Pairing:	PIN, Simple Secure Pairing, NFC OOB Pairing.

[1] Minimum operating time figures are based on new units that have been stored, charged and operated within the stated Environmental Specifications. Units stored over 3 months must be recharged every 3 months. Number of transponders in the environment affects minimum operating time.

[2] Light Use: Continuous RFID inventories for 20s of every 120s

[3] Moderate Use: Continuous RFID inventories for 10s of every 30s

[4] Heavy Use: Continuous RFID inventories for 59s of every 60s

[5] Compatible *Bluetooth*® stack required in the Host device

[6] Tag Read/Write performance is dependent on tag type, items tagged, number of tags in the field and other radio and environmental factors

[7] Artificial lighting can affect scanning performance

[8] Open field

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Peripherals and Accessories

External interface:	8-way sealed connector with gold plated contacts.
Bundled accessories:	Battery.
Other accessories available:	Docking Station with power and Mini USB cable. Adapter mounts for a variety of smartphones, handheld terminals and touchscreen devices.

Regulatory

Regions	EU (CE), USA (FCC), Canada, New Zealand and more (see page 4 for details)
FCC ID	S6J1166
IC	8948A-1166
EMC	EN 55032:2015 +A11:2020 EN 55035:2017 +A11:2020 47 CFR Part 15B ICES-003:2020 Issue 7
RF	EN 300 328 V2.2.2 EN 302 208 V3.2.0 EN 301 489-1 V2.2.3 EN 301 489-3 V2.1.1 EN 301 489-17 V3.2.4 47 CFR Part 15C 15.247 RSS-247 Issue 1
RF Exposure	EN 50566:2013 EN 62209-1:2016 EN 62209-2:2010 EN 62479:2010 47 CFR Part 2.1093 RSS-102 Issue 5
Electrical Safety	IEC 62368-1:2018 EN 62368-1:2020 +A11:2020 UL 62368-1:2019 CAN/CSA C22.2 No. 62368-1:19
Environmental	2011/65/EU (RoHS 2) Restriction of the use of certain Hazardous Substances in electrical and electronic equipment 2015/863 (RoHS 3) Amendment to Annex II of 2011/65/EU

Warranty

The TSL® 1166 reader is warranted against manufacturing defects for a period of one year (12 months) from date of shipment, provided the product remains unmodified and is operated under normal and proper conditions.

Full warranty information can be downloaded from the TSL® website at www.tsl.com/warranty.

Terms

The *Bluetooth*® word mark and logos are registered trademarks owned by *Bluetooth* SIG, Inc. and any use of such marks by Technology Solutions UK Ltd is under license. Other trademarks and trade names are those of their respective owners.

TSL® RFID Apps

RFID Explorer
www.tsl.com/apps/rfid-explorer

RFID Tag Finder
www.tsl.com/apps/rfid-tag-finder

RFID Web Wedge
www.tsl.com/apps/rfid-web-wedge

RFID Scan Scan Write
www.tsl.com/apps/rfid-scan-scan-write

TSL® Reader Configuration
www.tsl.com/apps/tsl-reader-configuration

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1166 PART NUMBERS

Countries	Part Numbers	Operating Frequency
Albania, Andorra, Austria, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Falkland Islands, Finland, France, French Guiana, Georgia (Licence Required), Germany, Greece, Greenland, Guernsey, Guadeloupe, Hungary, Iceland, Iraq, Ireland, Italy, Jersey, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Martinique, Monaco, Montenegro, Netherlands, Norway, Oman, Poland, Portugal, Qatar, Romania, Saudi Arabia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom (UK)	With 2D barcode imager: 1166-ES1 No barcode imager: 1166-EX1	865 – 868 MHz 4 Channels
United States of America (USA), Canada, Ecuador, Guam, Guatemala, Puerto Rico, Northern Mariana Islands	With 2D barcode imager: 1166-AS1 No barcode imager: 1166-AX1	902 – 928 MHz 50 Channels
Bangladesh	1166-AS1-BD 1166-AX1-BD	925 – 927 MHz 4 Channels
Brazil (Licensed via ACURA)	1166-AS1-BR	902 – 907.5, 915 – 928 MHz 35 Channels
Colombia	1166-AS1-CO 1166-AX1-CO	915 – 928 MHz 24 Channels
Egypt	1166-ES1-EG 1166-EX1-EG	865 – 868 MHz 4 Channels
El Salvador	1166-AS1-SV 1166-AX1-SV	915 – 928 MHz 24 Channels
Kazakhstan	1166-ES1-KZ 1166-EX1-KZ	865 – 868 MHz 4 Channels Power Limited: 100mW EIRP Max
Japan	1166-AS1-JP	916.7 - 920.9 MHz 6 Channels
New Zealand (Licensed via EMC)	1166-AS1-NZ 1166-AX1-NZ	921.5 – 928 MHz 11 Channels
Pakistan	1166-ES1-PK 1166-EX1-PK	865 – 868 MHz 4 Channels Power Limited: 100mW EIRP Max
Thailand (Licence Required)	1166-AS1-TH	920 – 925 MHz 10 Channels

If you are interested in purchasing for a country/region that is not listed above, please contact enquiries@tsl.com for assistance.

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1166 PART NUMBERS

Charging Accessories	Part Number
1166/3166 Docking Station Kit, 65W PSU and Mini USB lead	1166-CRD-01-KIT
Line Cord (UK Plug, 2m)	IEC-2M-UK
Line Cord (US Plug, 1.8m)	IEC-1.8M-US
Line Cord (EU Plug, 1.8m)	IEC-1.8M-EU
Line Cord (AU/NZ Plug, 2m)	IEC-2M-AU-NZ
1166/3166 External Battery Charger. Includes PSU and UK Line Cord	1166-BC-UK
1166/3166 External Battery Charger. Includes PSU and US Line Cord	1166-BC-US
1166/3166 External Battery Charger. Includes PSU and EU Line Cord	1166-BC-EU
1166/3166 External Battery Charger. Includes PSU and AU/NZ Line Cord	1166-BC-AU-NZ
Spare Battery – Rechargeable Lithium Polymer for 1166/3166 UHF Reader	1166-00-BA-3000

Pop-Loq® Mounts	Part Number
Pop-Loq Mount for CAT S40	PL-CAT-S40
Pop-Loq Mount for CAT S41	PL-CAT-S41
Pop-Loq Mount for Datalogic Skorpio X3/ X4	PL-DLX3
Pop-Loq Mount for Honeywell CT50	PL-H-CT50
Pop-Loq Mount for Honeywell D75e	PL-H-D75E
Pop-Loq Mount for Honeywell D75e – Extended Battery	PL-H-D75E-X
Pop-Loq Mount for iPad Air 2	PL-IPADAIR2
Pop-Loq Mount for iPad Mini 4	PL-IPADMINI4
Pop-Loq Mount for iPhone 5	PL-IPHN5G
Pop-Loq Mount for iPhone 6	PL-IPHN6G
Pop-Loq Mount for iPhone 6 Plus	PL-IPHN6G-PLUS
Pop-Loq Mount for iPhone 7	PL-IPHN7G
Pop-Loq Mount for iPhone 7 Plus	PL-IPHN7-PLUS
Pop-Loq Mount for iPhone 8	PL-IPHN8G
Pop-Loq Mount for iPhone 8 Plus	PL-IPHN8-PLUS
Pop-Loq Mount for iPhone XS	PL-IPHNXS
Pop-Loq Mount for iPod 5/6G	PL-IPOD6G
Pop-Loq Mount for Samsung Galaxy J5 (2016 version)	PL-J5-2016
Pop-Loq Mount for Samsung Galaxy J7 (2017 version)	PL-J7-2017
Pop-Loq Mount for Moto G (3rd Gen)	PL-MOTO-G-GEN3
Pop-Loq Mount for Otterbox Defender, iPod 5/6G	PL-OBD-IPOD5/6
Pop-Loq Mount for Samsung Galaxy S5 (2017)	PL-S5-2017
Pop-Loq Mount for Samsung Galaxy S9 Plus (2018)	PL-S9-PLUS-2018
Pop-Loq Mount for Samsung Tab A 7”	PL-SAMSUNG-TAB-A7”
Pop-Loq Mount for Zebra TC20	PL-TC20

Pop-Loq® Mounts	Part Number
Pop-Loq Mount for Zebra TC51 /56	PL-TC51/56
Pop-Loq Mount for Zebra TC55	PL-TC55
Pop-Loq Mount for Zebra TC70 /75	PL-TC70/75
Pop-Loq Mount for Samsung Galaxy Xcover 3	PL-XCOVER3
Pop-Loq Mount for Samsung Galaxy Xcover 4	PL-XCOVER4

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ABOUT

ABOUT TSL®

Technology Solutions UK Ltd (TSL®), part of HID, is a leading manufacturer of high performance mobile RFID readers used to identify and track products, assets, data or personnel.

For over two decades, TSL has delivered innovative data capture solutions to Fortune 500 companies around the world using a global network of distributors and system integrators. Specialist in-house teams design all aspects of the finished products and software ecosystems, including electronics, firmware, application development tools, RF design and injection mould tooling.

TSL is an ISO 9001:2015 certified company.

ISO 9001: 2015

CONTACT

Address:	Technology Solutions (UK) Ltd, Suite A, Loughborough Technology Centre, Epinal Way, Loughborough, Leicestershire, LE11 3GE, United Kingdom.
Telephone:	+44 1509 238248
Fax:	+44 1509 214144
Email:	enquiries@tsl.com
Website:	www.tsl.com

ABOUT HID

HID powers the trusted identities of the world's people, places and things. We make it possible for people to transact safely, work productively and travel freely. Our trusted identity solutions give **people** convenient access to physical and digital **places** and connect **things** that can be identified, verified and tracked digitally. Millions of people around the world use HID products and services to navigate their everyday lives, and billions of things are connected through HID technology. We work with governments, educational institutions, hospitals, financial institutions, industrial businesses and some of the most innovative companies on the planet. Headquartered in Austin, Texas, HID has over 4,000 employees worldwide and operates international offices that support more than 100 countries. HID is an ASSA ABLOY Group brand.

For more information, visit www.hidglobal.com.

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