SONY

White paper

January 2014

Xperia™ Z1 L39u

Purpose of this document

Sony product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

Document history

Version		
January 2014	First released version	Version 1

Sony Mobile Developer World

For the latest technical documentation and development tools, go to *www.sonymobile.com/developer.*

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Product overview

Xperia™ Z1 L39u highlights

- Sony G Lens, 1/2.3" 20.7 MP Exmor RS™ for mobile image sensor and BIONZ™ for mobile image processing engine
- 5" Full HD TRILUMINOS™ Display for mobile with X-Reality™ for mobile picture engine
- Water and dust resistant (IP55 & IP58), durable tempered glass with a plastic frame
- Qualcomm Snapdragon™ 800 quad-core 2.2 Ghz processor, 3000 mAh battery, battery STAMINA Mode

The world's best camera in a water resistant smartphone*

Sharper. Clearer. Brighter. That's what Sony's industry leading compact digital cameras give you. And now with Xperia™ Z1 L39u, we have created a groundbreaking smartphone built with the very same components, giving you the most stellar picture and video quality possible. By combining the large 1/2.3" 20.7MP Exmor RS™ for mobile image sensor, Sony's award-winning G Lens, and intelligent BIONZ™ for mobile image processing engine, the results are nothing less than amazing. The light-sensitive 27mm wide angle lens comes with an aperture of F2.0. Wide apertures mean that *bokeh* – the way the lens renders out-of-focus points of light – will be naturally incorporated in images produced. The large high sensitivity sensor is made exclusively for Xperia™ Z1 L39u and is equivalent to the sensor size used in Sony's Cyber-shot™ digital still cameras, which together with the intelligent noise reduction capabilities of the image processing engine and the sensitive ISO 6400 enables incredibly clear low-light pictures without sacrificing detail. The high pixel resolution, aspherical lens and BIONZ™ for mobile super resolution technology enables zoom without quality loss - just like an optical zoom, while the high shutter speed reduces any risk of blurry footage. Images are delivered with super sharpness, clarity and brightness.

*Xperia™ Z1 L39u features a camera combining the world's largest image sensor (1/2.3 inches) with the highest resolution (20.7MP) in a water resistant smartphone. It also includes the brightest lens (F2.0) available in a slim (8.5mm) water resistant (IPX5/IPX8) smartphone. Specifications verified by Strategy Analytics' SpecTRAX service as of 10th of May 2013. For more information on Strategy Analytics results, go to: www.sonymobile.com/testresults/.

The best colour and sharpness ever

Built with the latest Sony BRAVIA® technologies optimised for mobile, Xperia™ Z1 L39u incorporates a large high-resolution 5" Full HD TRILUMINOS™ Display for mobile, for a wider palette of rich, natural colours – just like having a broader range of colour pencils to draw from. With Sony's exclusive X-Reality™ for mobile picture engine, everything you watch – from HD movies to web videos and photos – is analysed and selectively processed to deliver clean, clear, and lifelike pictures. In addition, the Intelligent Super Resolution technology finds and reproduces lacking pixels, so you'll always be able to enjoy the sharpest videos, preventing your entertainment from being spoiled by low resolution videos. The display comes with a 1920 x 1080 progressive scan, for incredibly crisp pictures free of jagged edges. Paired with a pixel density of 441 pixels per inch, you get pictures that are razor sharp and incredibly bright.

Smart, sleek and water resistant*

Building upon the rich history of Sony's craftsmanship, Xperia™ Z1 L39u has been carefully crafted using only clean lines and premium materials. With OmniBalance™ design, this smartphone offers balance and symmetry in all directions, creating a smartphone that feels wonderful to hold in every angle. Both the front and back are made of durable tempered glass, reflecting the world around you while allowing you to get so immersed in content that the hardware virtually disappears. The plastic frame with sleek metallic

parts creates premium expression. Paired with the Magnetic Charging Dock DK31, charging is made smooth and comfortable, with no need to open a USB cap. And due to its IP55/IP58 rating, this slim and sleek smartphone is both water and dust resistant. In fact, even the headphone jack is water resistant. For a smartphone that is just as breathtaking as it is tough.

*In compliance with IP55 and IP58, Xperia™ Z1 L39u is protected against the ingress of dust and is water resistant. Provided that all the covers for the micro USB port, the micro SIM slot is firmly closed, the phone is (i) protected against low pressure jets of water from all practicable directions in compliance with IP55; and/or (ii) can be kept under 1 metre of freshwater for up to 30 minutes in compliance with IP58. For more information, go to www.sonymobile.com/xperia-z1-waterresistant.

Blazing fast performance

Performance that never lets you down. Isn't that what we're all craving for? With Xperia™ Z1 L39u, that's exactly what you get. This smartphone supports super-fast TDLTE networks, giving you access to entertainment anytime and anywhere. With the latest Qualcomm Snapdragon™ 800 quad-core 2.2 Ghz processor with 2GB RAM, this smartphone comes with ultra-fast performance and breathtaking graphics.

Better battery life

Smartphones use a lot of power, even when you're not actively using them. All those apps that you have on your phone may still be running in the background, draining your battery. Battery STAMINA Mode saves you wasted battery drain. It recognises when you're not using your display and automatically turns off the functions you don't need, while keeping the notifications you want. As soon as you press the power button to wake up your screen, everything is up and running again. So not only do you have an enormous 3000 mAh battery, Battery STAMINA Mode helps you cleverly maximise every bit of that energy.

Info-eye™ – An innovative way to gain information

Snap a photo of a specific object and Info-eye™ can tell you more about what it sees. Where was that bottle of wine made and how good is it? What is that book all about? How tall is the Eiffel Tower and what restaurants are nearby? Info-eye™ is an innovative way to search for information on things that interest you – right through your camera viewfinder.

Timeshift burst – Catch the best shot

Capture the right moment, or all the moments, even when things are in motion. With Timeshift Burst, Xperia® Z1^S's camera captures 61 frames in just 2 seconds – starting 1 second before you press the shutter. All 61 frames fan out like a deck of cards for you to scroll back and forth to find your favorite. Keep all of them and scroll back and forth repeatedly to create your very own digital flip book.

AR effect – Add some fun to your shots

Put some fantasy and fun in your photos with AR (Augmented Reality) effect. Choose between several animated themes ranging from disco to dinosaurs to under-the-sea. Capture a creative selfie using the front-facing camera and Masquerade theme. The themes are fully customizable, so you can select just how many fish you want or the mask that you'd like to wear.

Facts – dimensions, weight, performance and networks

Operating system	Google™ Android™ 4.2 (Jelly Bean)
Processor	2.2 GHz Qualcomm MSM8974 Quad Core
GPU	Adreno 330
Size	145.7 x 73.9 x 8.55 mm
Weight	163 grams
Available colours	Black Purple
SIM card	micro SIM
Main screen	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	5.0 inches
Input mechanisms	
Text input	On-screen QWERTY keyboard
Touch screen	Capacitive
Touch gesture	Yes – multi-touch, up to 10 fingers supported
Memory	
RAM	2 GB
Flash memory	Up to 32 GB*
Camera	
Camera resolution	20.7 MP
Digital zoom	8x
Photo light	Yes – Pulsed LED
Video recording	Yes – HD 1080p
Front Camera	Yes – HD 1080p for video chat and 2 MP for camera capture
Sensors	
Accelerometer	Yes
Proximity sensor	Yes
Ambient light sensor	Yes
Magnetometer	Yes

Gyroscope	Yes
Networks	
L39u	GSM GPRS/EDGE 850, 900, 1800 MHz, 1900 MHz TD-LTE Band 41 FDD-LTE Band 3 (roaming only) UMTS HSPA+ Bands 1, 2, 5
Data transfer speeds	
GSM GPRS	Up to 107 kbps
GSM EDGE	Up to 296 kbps
HSUPA (upload)	Cat 6, up to 5.76 Mbps
HSDPA (download)	Cat 24, up to 42.2 Mbps
LTE (upload)	Cat 4, up to 50 Mbps
LTE (download)	Cat 4, up to 150 Mbps
Talk time (GSM)	Up to 15 hours**
Standby time (GSM)	Up to 712 hours**
Talk time (UMTS)	Up to 15 hours**
Standby time (UMTS)	Up to 712 hours**
Standby time (LTE)	Up to 502 hours**
Music listening time	Up to 40 hours**
Video playback time	Up to 6.75 hours**
Battery (Embedded)	3000 mAh minimum

Memory comprises approximately 6 GB of firmware, plus 26 GB of "Internal storage" for music, pictures and movies, and downloaded applications and their data.

**** *Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.*

NOTE: Battery performance may vary depending on network conditions and configurations, and device usage.

NOTE: Performance metrics measured under laboratory conditions.

Categorised feature list

Camera

20.7 megapixel camera
8x digital zoom
Auto focus
Burst mode
HDR for photos and movies
Face detection
Flash/Pulsed LED
Flash/Photo light
Front-facing camera (2 MP 1080p)
Geotagging
HD video recording (1080p)
Image stabiliser
Object tracking
Picture Effect
Portrait Retouch
Quick Launch
Red-eye reduction
Scene recognition
Self-timer
Send to web
Smile Shutter™
Sony Exmor RS® for mobile
Image sensor
Superior Auto
Sweep Panorama
Touch capture
Touch focus
White balance

Music

3D Surround Sound (VPT)
Album art
APT-X
Bluetooth® stereo (A2DP)
ClearAudio+
Clear bass
Clear Phase™
Clear stereo
Dynamic normaliser
Low power audio playback***
Music tones (MP3/AAC)
PlayNow™ service*
SensMe™
TrackID™ music recognition*
"WALKMAN" application
xLoud™ Experience

Internet

Baidu search
Baidu for Sony
Baidu cloud album
Bookmarks
Info-eye™*
Pan & zoom
Xperia™ Home*
Web browser (WebKit™)*

Communication
Call list
Call recording
Noise suppression
Polyphonic ringtones
Speakerphone
Slow talk
Talk equaliser
Voice enhancement
Xperia™ Socialife*

Messaging
Conversations
Email
Handwriting recognition
Multimedia messaging (MMS)
Predictive text input
Sound recorder
Text messaging (SMS)

Design
Auto rotation
Direct touch
Face Unlock
Gesture input
IP58 (water resistant)**
IP5X (Dust-proof)
On-screen QWERTY keyboard
STAMINA mode
Screenshot capturing
Throw
X-Reality™ for mobile
Touch screen
Triluminos™
Voice input*
Wallpaper

Entertainment
3D games
Media browser
Motion gaming
Radio (FM radio with RDS)
Reader mode
SensMe™ slideshow
TV launcher
Video streaming

Organiser
Airplane mode
Alarm clock
Calculator
Calendar
Contacts
Document readers
eCompass™
Lunar calendar
Notes
Setup guide
Stopwatch
Tasks
Timer

Connectivity
3.5 mm audio jack (CTIA)
aGPS*
Bluetooth® 4.0 wireless technology
DLNA Certified®
GLONASS*
MHL support
Media Go™*
Media Transfer Protocol support
Micro USB support
Native USB tethering
NFC
PC Companion
Screen mirroring
Smart Connect
Microsoft® Exchange ActiveSync®
Synchronisation via SyncML™
USB charging
USB High speed 2.0 support
Xperia Link™
WLAN
WLAN Hotspot functionality

This service is not available in all markets.

** In compliance with IP55 and IP58 standards, Xperia™ Z1 L39u is protected against the ingress of dust and water. Provided that all ports and covers are firmly closed, the phone is (i) protected against low pressure jets of water from all practicable directions in compliance with IP55; and/or (ii) can be kept under 1.50 metres of freshwater for up to 30 minutes in compliance with IP58. The phone is not designed to float or work submerged underwater outside the IP55 or IP58 classification range that may lead to your warranty being void. To find out more, go to more www.sonymobile.com/testresults.

*** This feature is only available when you play music using the "WALKMAN" application.

Technologies in detail

NOTE: The information outlined below is general and levels of compliance to standards and specifications may vary between products and markets. For more information, contact Sony Mobile Developer World or your Sony contact person where applicable.

Device-to-device communications (local)

Bluetooth® wireless technology

Bluetooth® profiles supported	Advanced Audio Distribution Profile v1.2 Audio/Video Remote Control Profile v1.3 Device Identification Profile v1.3 Generic Attribute Profile Client/Server over LE Handsfree Profile v1.6 (Wide band speech) Headset Profile v1.2 Health Device Profile v1.1 Human Interface Device Profile, Host role v1.1 Messaging Access Profile v1.0 Object Push Profile v1.1 Personal Area Networking Profile v1.0 Phonebook Access Profile v1.1 Proximity Monitor Profile over LE v1.0 Serial Port Profile v1.1
Core version and supported core features	Version 4.0
Connectable devices	Products support at least one of the Bluetooth® profiles listed above. Bluetooth® 4.0 accessories generally require installation of a supporting application.

More information:

www.sonymobile.com/developer

www.bluetooth.com

WLAN

Supported standards	IEEE 802.11b/g/n and WLAN WLAN Direct, WLAN Protected Setup
Connectable devices	WLAN access points WLAN Direct compatible devices
Frequency band	2.4 GHz
Data transfer rate	Up to 150 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	M-DMS – Mobile Digital Media Server Media Types: images, music and video Summary: The digital media server exposes the media files in your device to a WLAN network. The files can then be accessed from other DLNA Certified® clients. +PU+ Media Types: image, video and music Summary: Play media in your device on another device, such as a TV or computer using 2 box push technology. +PU+ is integrated in the Album, Movies and Walkman applications. M-DMP – Mobile Digital Media Player Media Types: image, video and music Summary: Play content stored on another device, for example, a server or a PC, directly on your device. +DN+ Media Types: video and music Summary: Download content stored on another device, for example, a server or a PC, and play the downloaded content directly on your device.
Supported Bearers	WLAN WLAN Direct
DRM Support	The DLNA Certified® implementation does not support DRM-protected content.

Messaging

MMS (Multimedia Messaging Service)
According to OMA Multimedia Messaging Service v1.0 + SMIL

Email

Bearer type (IP)	GPRS, EGPRS, UMTS
Character sets	BIG5 Traditional Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese US-ASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (read only)

More information:

www.sonymobile.com/developer

www.openmobilealliance.org

Positioning – location based services

Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0 & v2.0

- 3GPP™ Control Plane location (incl. Emergency location)

- Qualcomm® GPSOneXtra™

Supported satellite systems:

- GPS

- GLONASS*

*NOTE: GPS and GLONASS are used together to calculate the position. Positioning is more robust and accurate in most conditions if both systems are active. The benefits of using GLONASS are automatically available for all applications using the Satellite Positioning API (referred to as "GPS Provider" in Android terminology).

Provisioning (OMA CP)

OMA CP version 1.1

Multimedia (audio, image and video)

Audio Playback	Decoder format	Supported in file format
	MP3	MP3 (.mp3)
	AAC (AAC-LC, AAC+, eAAC+)	3GPP (.3gp, 3gpp, mnv), MP4 (.mp4, .m4a), ADTS (.aac)
	AMR-NB, AMR-WB	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a), AMR (.amr, .awb)
	MIDI	SMF (.mid), XMF (.xmf), Mobile XMF (.mxmf), OTA (.ota), RTTTL (.rtttl), RTX (.rtx), iMelody (imy)
	PCM	WAV (.wav)
	Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
Audio Recording	**Encoder format**	**Supported in file format**
	AMR (AMR-NB, AMR-WB)	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a) AMR (.amr)
	AAC (AAC-LC)	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4a)
Image Playback	**Decoder format**	**Supported in file format**
	Windows bitmap	BMP (.bmp)
	GIF	GIF (.gif)
	JPEG	JPEG (.jpg, .jpeg)
	PNG	PNG (.png)
	BMP	BMP (.bmp)
	WebP	WebP (.webp)
Image Capture	**Encoder format**	**Supported in file format**
	JPEG	JPEG (.jpg)

Video Playback	Decoder format	Supported in file format
	MPEG-4	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv), AVI (.avi), Xvid (.xvid)
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v) Matroska (.mkv)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	VP8	Webm (.webm, .mkv)
Video Recording	Encoder format	Supported in file format
	H.264	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v), Video Unlimited (.mnv)
	H.263	3GPP (.3gp, .3gpp), MP4 (.mp4, .m4v)
	MPEG-4	3GPP (.3gp), MP4 (.mp4)
Audio/Video Streaming	Streaming transport	RTSP HTTP progressive download HLS
DRM	DRM (Digital Rights Management) – features the rights and copy protection of downloaded content	OMA DRM v1.0 Marlin DRM Widevine Level 3 PlayReady DRM (available in specific regions)

Synchronisation (OMA DS, EAS)

OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Related information:

www.sonymobile.com/developer

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