

# ELLA-W1 series



## Host-based multiradio modules with Wi-Fi & Bluetooth

### Best-in-class transmission power and sensitivity

- Automotive and professional grades
- Dual-band Wi-Fi 2.4 & 5 GHz
- Bluetooth v3.0 + HS
- High transmission power and sensitivity
- Simultaneous client and micro access for up to 10 clients
- Low power consumption



14.8 × 14.8 × 2.5 mm

### Product description

ELLA-W1 is an ultra-compact, Wi-Fi & Bluetooth front-end module with an extended temperature range from -40 °C to +85 °C offered in automotive and professional grades. It is designed for both simultaneous and independent operations of:

- Wi-Fi 802.11a/b/g/n
- Bluetooth v3.0+HS

ELLA-W1 includes an integrated MAC / Baseband processor and RF front-end components and can connect to a host processor through its SDIO interface. The modules are radio types approved for Europe (CE), the United States (FCC), Canada (IC), Taiwan (NCC), Japan (MIC), and Australia/New Zealand (ACMA).

### Key features

- Wi-Fi standards IEEE 802.11a/b/g/n
- Concurrent Wi-Fi and Bluetooth connections
- Support of Wi-Fi direct mode
- 802.11 PHY data rates of up to 150 Mbps (40 MHz channel)
- Hardware encryption engine for 128-bit AES
- WAPI support
- Bluetooth v3.0+HS (High Speed)
- Royalty free drivers for Linux and Android
- Automotive qualification tests according to ISO 16750-4

	ELLA-W131	ELLA-W133	ELLA-W161	ELLA-W163
<b>Grade</b>				
Automotive	*	*	*	*
Professional	•	•	•	•
Standard				
<b>Radio</b>				
Bluetooth qualification		v3.0+HS		
Bluetooth profiles		HCI		
Bluetooth BR/EDR	•	•	•	•
Wi-Fi IEEE 802.11 standards		b/g/n	a/b/g/n	
Wi-Fi 2.4 / 5 [GHz]		2.4	2.4 and 5	
Bluetooth output power conducted [dBm]	7	10	7	10
Wi-Fi output power conducted [dBm]	18	18	18	18
Antenna type	1p	2p	1p	2p
<b>OS support</b>				
Android / Linux drivers (from u-blox)	•	•	•	•
QNX (via third party)	•	•	•	•
<b>Interfaces</b>				
SDIO [version]	v2	v2	v2	v2
PCM (Bluetooth audio)	1	1	1	1
<b>Features</b>				
Micro Access Point [max connects]	10	10	10	10
AES hardware support	•	•	•	•
Wi-Fi direct	•	•	•	•
Factory-assigned MAC address	•	•	•	•
Factory calibrated RF	•	•	•	•
Router function with TOBY-L2	•			

1p = 1 antenna pin for combined Bluetooth and Wi-Fi  
 2p = 2 antenna pins, one each for Bluetooth and Wi-Fi

\* = Without RF shield

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## Features

Wi-Fi standards	IEEE 802.11a(optional)/b/g/n IEEE 802.11d/e/h/i/k*/r*/w
Wi-Fi transfer rates	IEEE 802.11n: – max. 150 Mbps (40 MHz channel) – max. 72 Mbps (20 MHz channel) IEEE 802.11g: 54,48,36,24,18,12,9,6 Mbps IEEE 802.11b: 11, 5.5, 2, 1 Mbps
Wi-Fi channels	2.4 GHz: 1-13 5 GHz: 36-165 (U-NII band 1, 2, 2e, 3)
Bluetooth	v3.0+HS (High Speed) v2.1+EDR (Enhanced Data Rate)
Antennas	1 combined or 2 separate antenna pins for Bluetooth and Wi-Fi
Output power	Wi-Fi IEEE 802.11b: 18 dBm Wi-Fi IEEE 802.11a/g/n: 15 dBm Bluetooth: 7 dBm for single antenna variant; 10 dBm for dual antenna variant

\* Not supported by firmware currently

## Software features

RF parameters	Available in on-board OTP memory
MAC addresses	Available in on-board OTP memory
Security	WEP64 / 128 WPA (TKIP, AES) WPA2 (CCMP, AES) WAPI hardware support 128-bit AES hardware support
Wi-Fi operational modes	Station (STA): Infrastructure & ad-hoc mode μAP: Supports up to 10 stations Wi-Fi direct One single firmware for Wi-Fi STA, μAP and Bluetooth
Driver support	Free of charge drivers for Android and Linux Third party drivers for: Windows Embedded CE 6.0, Windows Embedded Compact 7 and Windows Embedded Compact 2013
Wi-Fi/Bluetooth coexistence	Internal TDM mechanism
Support for low power modes	

## Electrical data

Power supply	3.3 VDC and 1.8 VDC
Power consumption	125 mA (average) @ 3.3 VDC 210 mA (max) @ 3.3 VDC

## Interfaces

Host interface	SDIO (4-bit)
Audio interface	PCM (Bluetooth audio)

## Package

Dimensions	14.8 x 14.8 x 2.5 mm for professional grade 14.8 x 14.8 x 2.0 mm for automotive grade
Mounting	Solder edge pins with castellations (visually inspectable)

## Environmental data, quality & reliability

Operating temperature	-40 °C to +85 °C
Automotive qualification according to ISO 16750-4	

## Certifications and approvals

Europe (ETSI RED)	
US (FCC CFR 47 part 15 unlicensed modular transmitter approval)	
Canada (IC RSS), Taiwan (NCC)*, Japan (MIC)*, Australia (ACMA)*	

\* See the Data Sheet for details

## Support products

The ELLA-W1 evaluation kits include an evaluation board which is a ready-made reference design. Users can either work with its onboard antenna or an external antenna connected via a coaxial connector. The board offers a standard SDIO connector for host communication.

EVK-ELLA-W161	Evaluation kit for versions with 1 antenna pin (ELLA-W131, ELLA-W131-A, ELLA-W161 and ELLA-W161-A)
EVK-ELLA-W163	Evaluation kit for versions with 2 antenna pins (ELLA-W133, ELLA-W133-A, ELLA-W163 and ELLA-W163-A)

## Product variants

ELLA-W131	Professional grade, with RF shield box, single-band (2.4 GHz), 1 antenna pin. Can be combined with TOBY-L2 LTE module for router functionality.
ELLA-W133	Professional grade, with RF shield box, single-band (2.4 GHz), 2 antenna pins
ELLA-W161	Professional grade, with RF shield box, dual-band (2.4 and 5 GHz), 1 antenna pin
ELLA-W163	Professional grade, with RF shield box, dual-band (2.4 and 5 GHz), 2 antenna pins
ELLA-W131-A	Automotive grade, single-band (2.4 GHz), 1 antenna pin. Can be combined with TOBY-L2 LTE module for router functionality.
ELLA-W133-A	Automotive grade, single-band (2.4 GHz), 2 antenna pins
ELLA-W161-A	Automotive grade, dual-band (2.4 and 5 GHz), 1 antenna pin
ELLA-W163-A	Automotive grade dual-band (2.4 and 5 GHz), 2 antenna pins

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

For more product details and ordering information, see the [product data sheet](#).

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