Product summary
IRIS-W16 series

Stand-alone Wi-Fi 6 multiradio modules

Dual-band Wi-Fi 6 network processor
- Dual-band Wi-Fi 6 and Bluetooth Low Energy 5.3
- u-connectXpress for accelerated time to market
- Full set of enhanced security features
- Efficient PCB antenna or external antenna options
- Global certification

Product description
IRIS-W16 series are small, stand-alone, dual-band Wi-Fi and Bluetooth Low Energy wireless modules, with everything needed for integration into end-products. The modules are ideal for users looking to add advanced wireless connectivity to their end products.

With Wi-Fi 6, several features improve network efficiency, latency, range, and power consumption compared to earlier Wi-Fi generations. In addition, Bluetooth Low Energy 5.3 further expands the number of use cases supported. The u-connectXpress software is flashed to the modules at delivery for simple end-product integration and reduced time-to-market. The host controller configures the wireless communication using high-level AT commands with no need for expertise in Wi-Fi and Bluetooth protocol stacks. IRIS-W16 supports Wi-Fi station or access point mode, and can take both roles concurrently. It can assume Bluetooth peripheral and central roles, or both simultaneously. It can be a GATT client and server. The software comes with a TCP/IP stack allowing for point-to-point and point-to-multipoint use cases. For secure communication with cloud-based applications and services, support for TLS encryption and MQTT protocols is provided. IRIS-W16 has secure authentication methods like WPA/WPA3, Wi-Fi enterprise security, and Bluetooth LE secure connections. A wide range of other features are also supported, all accessible through the AT command interface.

IRIS-W166 comes with an internal PCB antenna to provide a robust low-profile solution with high performance and an extensive range, while IRIS-W161 has a module pin to connect to an external antenna of choice. The modules are globally certified for use with the internal antenna or a range of external antennas. This reduces time, cost, and effort for customers integrating Wi-Fi and Bluetooth Low Energy in their products. The modules suit a wide range of applications, including industrial automation, smart buildings and homes, smart city, medical and healthcare devices, telematics, and EV charging.

UBX-23002191 - R01
Objective Specification
### IRIS-W16 series

#### Features

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<th>Category</th>
<th>Details</th>
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<tbody>
<tr>
<td>Wi-Fi standards</td>
<td>IEEE 802.11a/b/g/n/ac/ax</td>
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<tr>
<td>Wi-Fi channels</td>
<td>2.4 GHz channels 1-13 (depending on region) 5 GHz: 36-165, U-Ni Band 1, 2, 2e, 3 (depending on region)</td>
</tr>
</tbody>
</table>
| Wi-Fi maximum transfer rates | IEEE 802.11a: 54 Mbit/s  
IEEE 802.11b: 11 Mbit/s  
IEEE 802.11n: 72 Mbit/s  
IEEE 802.11ax: 115 Mbit/s |
| Bluetooth                 | v5.3 Bluetooth Low Energy                                             |
| Output power (conducted)  | Wi-Fi 2.4 GHz: 18 dBm  
Wi-Fi 5 GHz: 16 dBm  
Bluetooth: 13 dBm                                    |
| Sensitivity               | Wi-Fi 2.4 GHz: -97 dBm  
Wi-Fi 5 GHz: -90 dBm  
Bluetooth: -96 dBm                                        |
| Antenna                   | Internal PCB antenna or antenna pin for connecting to an external antenna |

#### Electrical data

- **Power supply**: 3.3 V (+/-10%)
- **Power consumption**: TBD

#### u-connectXpress features

This section describes the IRIS-W16 features integrated in the u-connectXpress software. All modules are delivered with this software pre-flashed and configured using AT commands.

- **Wi-Fi features**: Wi-Fi station, Wi-Fi access point
- **Bluetooth features**: u-blox Low Energy Serial Port Service (SPS), GATT server and client, Simultaneous central and peripheral roles
- **Security features**: Secure boot, WPA2/WPA3, Enterprise security (EAP-TLS, PEAP), End-to-end security with TLS 1.2/1.3, Protected Management Frames (PMF), Secure Simple Pairing, Bluetooth LE secure connections
- **IoT features**: TCP/UDP client/ server, MQTT client, HTTP client, DHCP client/server
- **Throughput (user data)**: Bluetooth Low Energy: TBD, Wi-Fi: TBD
- **Support tools**: s-center

#### Package

<table>
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| Dimensions                | IRIS-W161: 14.6 x 16.8 x 2.1 mm  
IRIS-W166: 14.6 x 20.9 x 2.1 mm |
| Mounting                  | Machine mountable solder pins                                          |

#### Environmental data, quality & reliability

- **Operating temperature**: –40 °C to +85 °C
- **Storage temperature**: –65 °C to +125 °C
- **Humidity**: RH 5-90% non-condensing
- **RoHS directive**: RoHS 2 and RoHS 3

#### Certifications and approvals

1. **Type approvals**: Europe (RED), United Kingdom (UKCA), US (FCC), Canada (ISED), Japan (MIC), Taiwan (NCC), South Korea (KCC), Australia (ACMA), New Zealand, Brazil (Anatel), South Africa (ICASA)

#### Support tools

- **s-center**

#### Support products

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<th>Product</th>
<th>Description</th>
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<tbody>
<tr>
<td>EVK-IRIS-W161</td>
<td>Evaluation kit for IRIS-W161 module with antenna pin</td>
</tr>
<tr>
<td>EVK-IRIS-W166</td>
<td>Evaluation kit for IRIS-W166 module with internal PCB antenna</td>
</tr>
<tr>
<td>USB-IRIS-W166</td>
<td>Evaluation kit for IRIS-W166 module with internal PCB antenna; USB-stick format</td>
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#### Product variants

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<tr>
<th>Product</th>
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<tbody>
<tr>
<td>IRIS-W161</td>
<td>Multiradio module with u-connectXpress and antenna pin</td>
</tr>
<tr>
<td>IRIS-W166</td>
<td>Multiradio module with u-connectXpress and internal PCB antenna</td>
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