

**WWAN module adapter
Model number: WW23E
User Manual**

GENERAL

This device is the WWAN module adapter, UMTS/LTE/NRSub-6 with carrier aggregation (CA)

Integration to the end product

1. Insert WW23E module into PCIe M.2 card connector.
2. Secure the end of product using the screw.
3. Insert Antenna unit into Antenna connectors of WW23E module.

Technical Specification

- | | |
|----------------------------|------------------------------|
| a) Dimensions (H x W x D): | Approx. 30mm x 52mm x 2.38mm |
| b) Weight: | 9g (max) |
| c) LTE Standard: | 3GPP Release 15 |
| d) UMTS Standard: | 3GPP Release 9 |
| e) NR Sub-6 Standard: | 3GPP Release 15 |
| f) Operating Temperature: | -30 to 70 degree Celsius |
| g) Connector interface: | PCIe M.2 |
| h) Host interface: | USB3.1 etc., |

Regulatory Information

RF Exposure Compliance information

The WW23E module will have been granted modular approval for mobile applications. Integrators may use the WW23E module in their final products without additional FCC / ISED (Innovation, Science and Economic Development Canada) certification if they meet the following conditions. Otherwise, additional FCC / ISED approvals must be obtained.

1. At least 20 cm separation distance between the antenna and the user’s body must be maintained at all times.
2. To comply with FCC / ISED regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed the limits stipulated in Table 1.

Table 1 Antenna Gain and Collocated Radio Transmitter Specifications

	Operating mode	TX Freq Range (MHz)		Max Time-Avg Cond Power (dBm)	Antenna Gain Limit (dBi)	
					Standalone	Collocated
WW23E	WCDMA Band 2	1850	1910	24.5	8.5	8
	WCDMA Band 4	1710	1755	24.5	5.5	5.5
	WCDMA Band 5	824	849	24.5	6	5.5
	LTE B2	1850	1910	24	8.5	8
	LTE B4	1710	1755	24	5.5	5.5
	LTE B5	824	849	24	6	6
	LTE B7	2500	2570	24.8	8	8
	LTE B12	699	716	24	6	5.5
	LTE B13	777	787	24	6	5.5
	LTE B14	788	798	24	6	6
	LTE B17	704	716	24	6	5.5
	LTE B25	1850	1915	24	8.5	8
	LTE B26	814	849	24	6	6
	LTE B30	2305	2315	24	0	0
	LTE B41	2496	2690	24.8	7	7
	LTE B41-HPUE	2496	2690	26	7	7
	LTE B42 ¹	3450	3550	24.8	5	5
	LTE B42/B43 ²	3450	3650	24.8 ^a	-1.8	-1.8
	LTE B48	3550	3700	24.8 ^a	-1.8	-1.8
	LTE B66	1710	1780	24	6	6
LTE B71	663	698	24	6	5.5	
5G NR n2	1850	1910	24.5	8.5	8	
5G NR n5	824	849	24.5	6	5.5	
5G NR n7	2500	2570	24.5	8	8	
5G NR n12	699	716	24.5	6	5	
5G NR n25	1850	1915	24.5	8.5	8	
5G NR n41	2496	2690	24.5	7	7	

	5G NR n48	3550	3700	24.5	-1.8	-1.8
	5G NR n66	1710	1780	24.5	5.5	5.5
	5G NR n71	663	698	24.5	5.5	5
	5G NR n77 ¹ /n78 ¹	3450	3550	24.5	5.5	5.5
		3700	3980			
5G NR n77 ² /n78 ²	3450	3980	24.5	-1.5	-1.5	
Collocated transmitters	WLAN 2.4 GHz	2400	2500	20	-	5
	WLAN 5 GHz	5150	5850	20	-	8
	Bluetooth	2400	2500	17	-	5

1. USA only

2. Canada only

***Important:** The FCC and IC have a strict EIRP limit in Band 30 for mobile and portable stations in order to protect adjacent satellite radio, aeronautical mobile telemetry, and deep space network operations. Mobile and portable stations must not have antenna gain exceeding 0 dBi in Band 30. Additionally, both the FCC and IC prohibit the use of external vehicle-mounted antennas for mobile and portable stations in this band.

***Important:** Airborne operations in LTE Band 48 are prohibited.

3. The WW23E module may transmit simultaneously with other collocated radio transmitters within a host device, provided the following conditions are met:
- Each collocated radio transmitter has been certified by FCC / ISED for mobile application.
 - At least 20 cm separation distance between the antennas of the collocated transmitters and the user’s body must be maintained at all times.
 - The radiated power of a collocated transmitter must not exceed the EIRP limit stipulated in Table 1.

A label must be affixed to the outside of the end product into which the WW23E module is incorporated, with a statement similar to the following:

- This device contains FCC ID: ACJ9TGWW23E, IC: 216H-CFWW23E

Instructions to OEM Integrators

A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC/ISED RF exposure guidelines.

The end product with an embedded the WW23E module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

If this module is intended for use in a portable device, integrators are responsible for separate evaluation and/or approval to satisfy FCC/ISED RF Exposure requirements.

If other radio devices are to be integrated with this module, an additional evaluation and FCC/ISED submission may be required. Integrators are responsible for such additional evaluation and FCC/ISED submission.