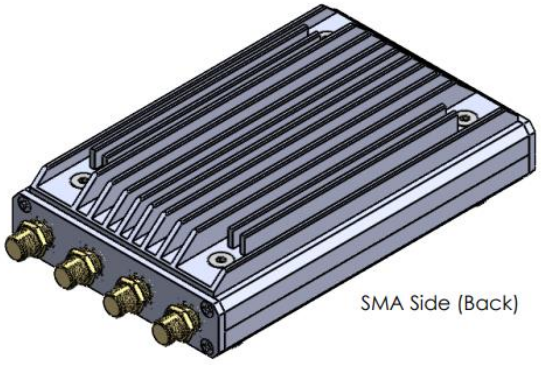
Ascent Modem

User Guide

KN Document Number: 900-00066-000, v1.2

SIM Side (Front)



SMA Side (Back)

Table of Contents

Ascent Modem - Overview

The K4Edge Ascent Modem is a USB-C 5G Modem. Data and power are supplied through the USB Type C connector. An optional 2 pin Molex MicroFit connector may be used to supply power if the USB-C host cannot provide sufficient current.

Device Use

Physical Ports

The following graphic shows the physical connections of the Ascent Modem.
The 2-pin Molex External Power connector is optional and supports +7 to +24 VDC. Applying voltage to the External Power port automatically switches Ascent Modem to use this power source instead of USB-C. Removing External power may cause the device to reset and disconnect any current data connection.

Figure 1: Physical Connections and Indicators

The **SIM1** port is the port closest to the USB Type C connector.
The **SIM2** port is the port closest to the Power Connector.

By default, **SIM1 is active**. To switch to SIM2, an AT command must be sent to the Ascent Modem using a serial terminal program.

The **Blue LED** indicates power is being supplied to the internal modem. Both USB-C power and External power will cause the LED to illuminate

The **Orange LED** indicates general WAN connectivity but does not indicate an active data session. If a SIM card is not present on initial power up, the Orange LED will not be illuminated. The Orange LED will be illuminated when a SIM is inserted and the Edge Ascent Modem is able to communicate with a cellular tower. Even with an invalid SIM subscription service plan, the Orange LED will be illuminated but data will not pass through the modem.

Data Connection

The K4 Edge Ascent Modem can be connected through USB-C to a Windows or Linux computer. The USB-C port is reversible; a USB-C to USB-A converter cable may also be used. For maximum data transfer a USB 3.2 port should be used, but Ascent Modem is also compatible with legacy USB 2.0 ports.

The power supplied to Ascent Modem is dictated by the power capability of the host device. Many ports that support USB 3.2 can supply 896 mA of current (approx. 4.5W).

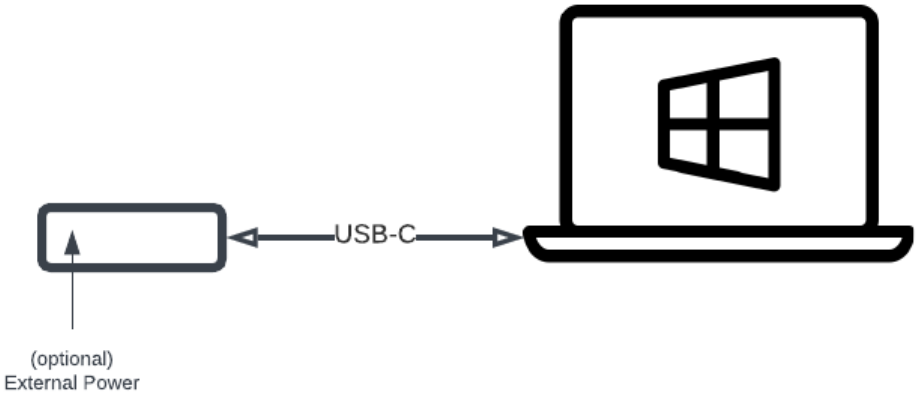


Figure 2: Data Connection for Ascent Modem

Windows Operation

To monitor connectivity status, open the Windows 11 Quick Settings panel from the System Tray by clicking on the Wi-Fi icon.

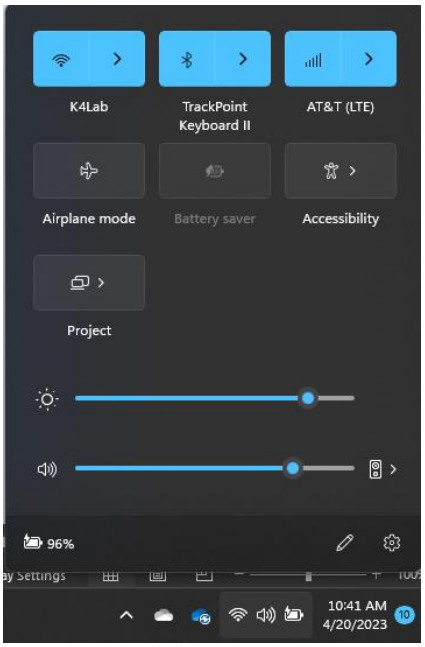


Figure 3: Quick Settings Panel shows Cellular Connectivity

The Quick Settings Panel shows cellular connectivity on the top right corner of the panel and provides a quick check on the Carrier (Service).

Clicking on the > icon allows the user to Mange Cellular connections.

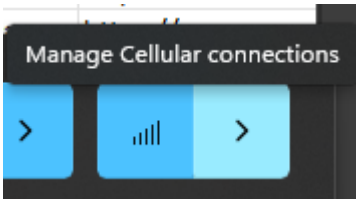


Figure 4: Manage Cellular Connections in Windows 11

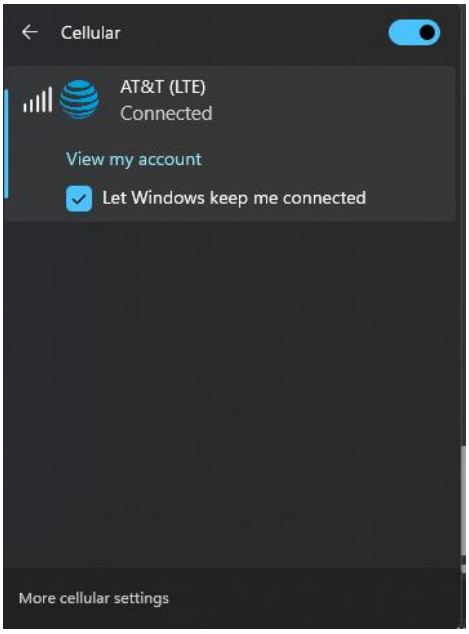
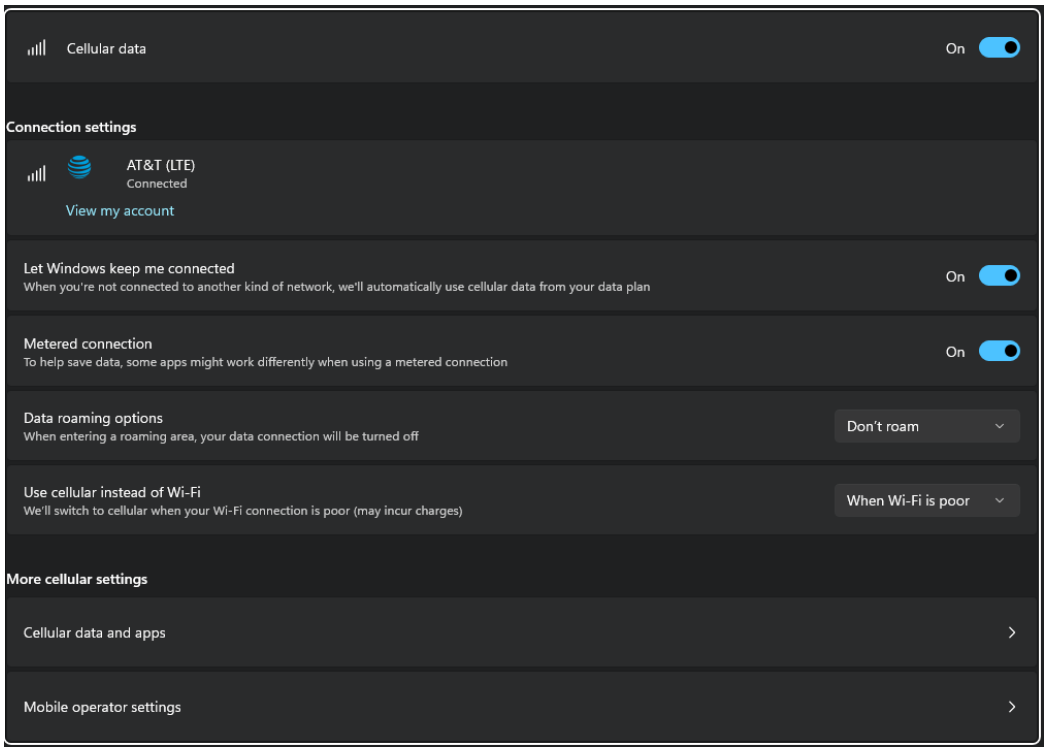


Figure 5: Access More cellular settings

Clicking on More cellular settings brings up the Network & internet > Cellular dialog. Here you can manage cellular data use and limits, enable roaming, and set Mobile Operator Settings, like APNs



Specifications

The following specifications list shows theoretical and technical (lab) performance. Technical performance is the upper limit to real world performance. Actual performance will vary and is heavily dependent on the host device, location, antennas, and external environment. The data plan, available channels, bandwidth allocation, and congestion of the carrier network to which the Ascent Modem is attached will dictate the maximum throughput of the device. Please check with the cellular carrier for expected cellular performance.

RF Specifications and Performance

Parameter	Specification	Note
Contains FCC ID	XMR2022RM520NGL	
CAT UL	CAT-18	
CAT DL	CAT-19	
GNSS	Yes, Unpowered	
eSIM	No	
Peak UL LTE	200 Mbps	
Peak DL LTE	1600 Mbps	
Peak UL NSA 5G	550 Mbps	
Peak DL NSA 5G	3400 Mbps	
Peak UL SA 5G	900 Mbps	
Peak DL SA 5G	2400 Mbps	
Max Sub6 BW	120 MHz	
Carrier Agg	5xCA	
MIMO	4x4	
5G NSA Bands	n1, **n2**, n3, **n5**, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, **n66**, n70, **n71**, n75, n76, **n77, n78**, n79	
5G SA Bands	n1, **n2**, n3, **n5**, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, **n66**, n70, **n71**, n75, n76, **n77**, **n78**, n79	
LTE-FDD	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, **B71**	
LTE-TDD	B34, B38, B39, B40, B41, B42, B43, B48	
LAA	B46	
WCMDA	B1, B2, B4, B5, B8, B19	
GNSS Bands	GPS/ GLONASS/ BDS/ Galileo	
RF Port 1 Tx	617-5000MHz	Primary LTE Tx, Diverse 5G Tx
RF Port 1 Rx	617-5000MHz	Primary LTE Rx, Diverse 5G Rx
RF Port 2 Tx	----	No transmission
RF Port 2 Rx	1452-5000 MHz	MIMO Rx for LTE and 5G midband
RF Port 3 Tx	1452-5000 MHz	Primary C-Band (5G) Tx, Diverse LTE Tx
RF Port 3 Rx	1452-5000 MHz	Primary C-Band (5G) Rx. Diverse LTE Rx
RF Port 4 Tx	617 - 960 MHz	Low Band Tx for LTE & 5G
RF Port 4 Rx	617-5000 MHz	Wide Band Rx

Data Specifications & Connectivity

Parameter	Specification	Note
Data port	USB Type C	Reversible
Data Standard	USB 3.2 / USB 3.1 / USB2.1	Auto-select USB speed based on port capability
Supported OS	Windows, Linux	

Device Physical Specifications

Parameter	Specification	Note
Dimensions	113.4mm x 67.3mm x 27 mm / 4.5” x 2.75” x 1.1”	
Weight	0.45 lbs / 200g	
RF ports	SMA-F, 4x4 MIMO	
USB-C Voltage	+5 VDC	
USB-C Current / Power	up to 3A, 896 mA nominal (15 W max, if supported)	Negotiated with USB-C Host; most PCs can only support 896 mA per port
External Voltage	+7 VDC to +24 VDC	Used when voltage detected on Molex Pin 1
External Power	19W peak, 15W continuous	
Mounting	M3x0.5 - 4 locations	Remove Rubber Feet for mounting points
Cooling	Passive, optional heatsink	
Operating temp	-10C to +70C	
Storage temp	-20C to +80C	
Humidity	up to 95% non-condensing	

Certifications

Federal Communication Commission (FCC)

Suppliers Declaration of Conformity
47 CFR § 2.1077 Compliance Information

Unique Identifier: 700-00025 / Ascent Modem

Responsible Party – U.S. Contact Information

Kognitive Networks fka K4 Mobility, Inc.
1200 N. Arlington Heights Rd. #430
Itasca, IL
60143

www.k4mobility.com

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Federal Communication Commission Interference Statement

Any change or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult an experienced radio technician for help

Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Industry Canada Statement

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference

(2) This device must accept any interference, including interference that may cause undesired operation of the device

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en

Radiation Exposure Statement

This device complies with the ISED radiation exposure limit set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme avec l'exposition aux radiations ISED définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimum de 20 cm entre le radiateur et votre corps.

EU Declaration of Conformity (DoC)

Hereby we,

Name of manufacturer:	**Kognitive Networks, fka K4 Mobility Inc.**
Address:	**1200 N. Arlington Heights Rd. #430**
Zip code & City:	**Itasca, IL 60143**
Country:	**America**
Telephone number:	**1-800-453-1324**

declare that this DoC is issued under our sole responsibility and that this product:

Product description:	**Cellular Modem**
Type designation(s):	**Ascent Modem**
Trademark:	**K4Edge**

is in conformity with the relevant Union harmonization legislation:
Radio Equipment Directive: **2014 / 53 / EU**

with reference to the following standards applied:

EN 301 489-1 V2.2.3	**EN 301 489-19 V2.2.1**
EN 301 489-52 V1.2.1	**EN 55032:2015+A1:2020**
EN 55035:2017+A11:2020	**EN IEC 62311:2020**
Draft EN 301 908-25 V15.1.1_0.0.17	**EN 301 908-13 V13.2.1**
EN 301 908-1 V15.2.1	**EN 301 908-2 V13.1.1**
EN 303 413 V1.2.1	**EN IEC 62368-1 :2020+A11 : 2020**

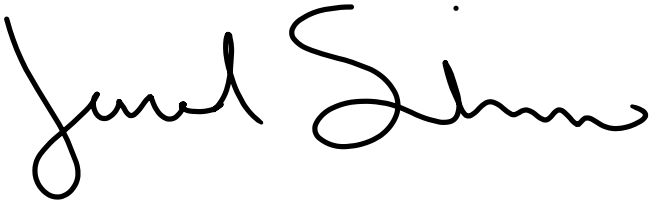
The Notified Body Timco Engineering, Inc., with Notified Body number 1177 performed:
[*applicable Modules: B+C*]

Where applicable:
The issued the EU-type examination certificate: [*E1177-xx*]

Description of accessories and components, including software, which allow the radio equipment to operate as intended and covered by the DoC: Certified as USB only and USB with external DC power

……

Signature:
Name: Jared Simon
Title: Director of Products



Appendix

Device Drivers

Drivers for Windows are not necessary if used as MBIM device; Ascent modem ships with MBIM enabled be default.

Controlling the Ascent Modem through QMI and AT commands is possible. Please download driver from Kognitive Networks.

Debug Windows Connectivity – COM connections

Once the appropriate Windows Drivers are installed, the EdgeAscent Modem will enumerate as a USB Serial COM device. The COM ports used can be seen in the device manager.

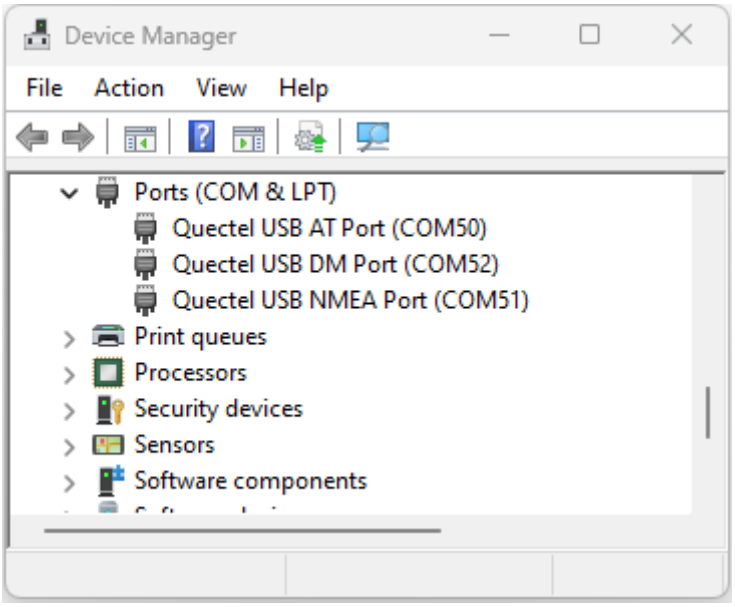


Figure 6: Device Manger lists the COM Parts Ascent Modem uses

The **AT Port** is the command interface for Ascent Modem.

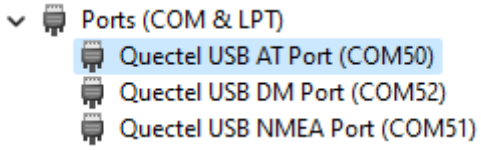
The **DM Port** is the physical port used for data transfer between the host device and the Ascent Modem.

The **NMEA Port** is a direct access port for monitoring GNSS data.

Windows Connectivity – Changing SIM cards (AT Port)

When running the device in MBIM mode, the option to change SIM cards is available through the Windows GUI. When using QMI mode, in order to change which SIM slot is being used a simple serial terminal program is required. PuTTY can be used to initialize a serial connection to the modem to change SIM slots using AT commands.

Use the Device Manager to locate the AT port



Download and run PuTTy. Choose 'Session' and Click the 'Serial' radio button. In the Serial Line box, enter the COM port that corresponds with AT Port found using the Device Manager.

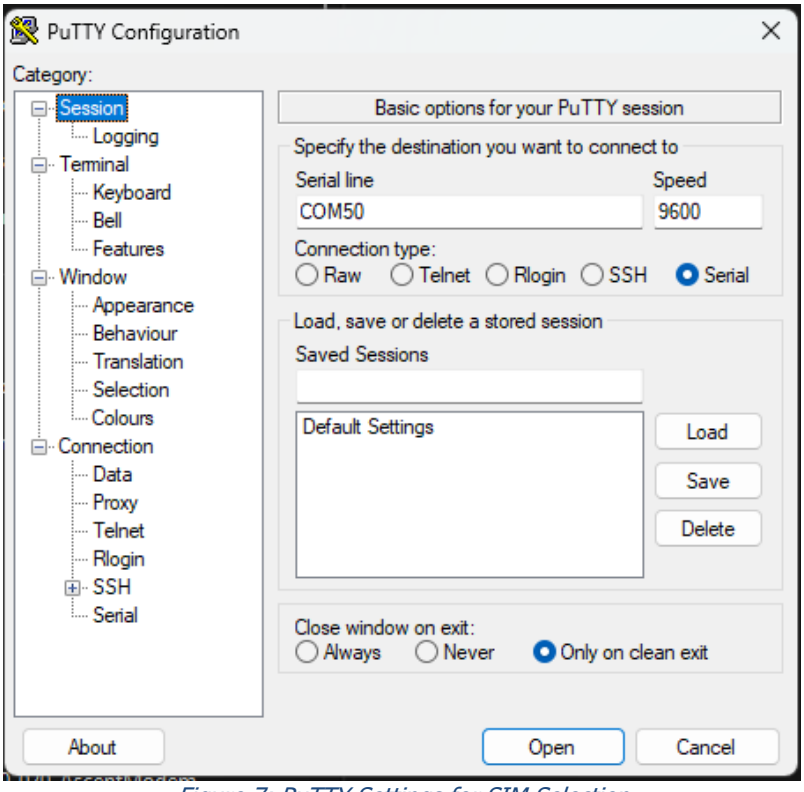
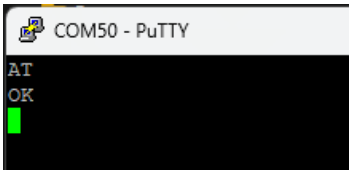


Figure 7: PuTTY Settings for SIM Selection

Test the AT Port connection by typing 'AT'. The Ascent Modem should respond with 'OK'



Check the SIM slot that is in use with the command:

AT+QUIMSLOT?

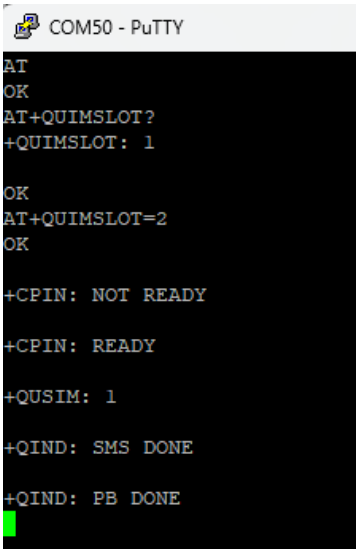
To use SIM slot 1, send the command:

AT+QUIMSLOT=1

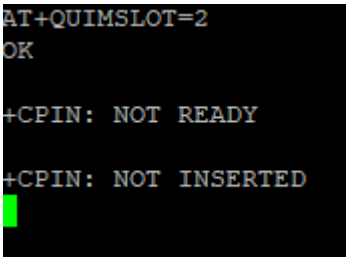
To use SIM slot 1, send the command:

AT+QUIMSLOT=2

As the SIM information loads, the following commands will be displayed:



If there is no SIM inserted, the following error will be displayed:



SIM Insertion Notes

After changing SIM cards, if SIM hot swap is not enabled, the AT command to enable the SIM card slot should be sent to ensure that the modem attempts to reload the SIM details and start a data connection.

Alternatively, after inserting a SIM card the device can be power-cycled to cause the SIM details to be read and a data connection request will be initiated.

Windows Connectivity – Data Connection (DM Port)

If the drivers are installed correctly and a SIM card is installed, Windows will use the default APN for the SIM identified by Windows and attempt to make a data connection.

Table of Figures

Revision History

Date	Version	Remark
Apr-20-2023	0.1	Preliminary Release for Certification
Aug-16-2023	1.0	Updates to support MBIM mode
Sep-11-2023	1.1	Added CE

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