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NIU X  
OEM/Integrators Installation Manual

Model Name	NIUX-UART-LIT , NIUX-USB-LIT
Description	NIUX Wi-Fi module for household and professional appliances
Version	Release 1.0
Date	May 12, 2017
Author	Livio Plos

**Revision History**



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Date	Release	Author	Description
2017-05-12	1.0	Livio Plos	First preliminary release.

**Related Documents**

Date	Author	Description
		Qualcomm Atheros QCA4531 datasheet
	IEEE.org	IEEE 802.11n 2.4 specifications

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## **1. Introduction**

NIU X is an IoE Smart Network module that enables wireless internet connectivity for any device wishing to be monitored or managed remotely. The NIU X is architected for high performance, feature-rich applications.

This module is based on Qualcomm QCA4531, a highly integrated and feature-rich IEEE 802.11n 2x2 2.4 GHz System-on-a-Chip (SoC). External DDR2 and SPI flash memories are provided to support a big variety of applications. On-board antennas provide robust radio coverage even if the module is being installed inside an appliance.

## **2. Features**

- 2.412-2.484 GHz for worldwide market
- IEEE 802.11n two stream radio
- Full security support: WPS, WPA, WPA2, WAPI, WEP, TKIP
- On-board memories: 64MB DDR2 and 32MB SPI NOR Flash
- Host interfaces: UART, I2C, GPIO, USB, and Ethernet
- ROM API support

### 3. Specification

<i>Model Number</i>	<i>NIU X</i>
Product Type	802.11n IoE module
Memory Sizes	Memories on-board: SPI Flash: 32MB DDR2:64MB
Host Interface(s)	UART, I2C, GPIO, USB, Ethernet
Embedded MAC Address	Yes
Main Chip	Qualcomm SoC QCA4531
Coating Material	OSIO SF711 or HUMISEAL 1A33
Wireless Standard(s)	IEEE 802.11b/g/n
Spreading	IEEE 802.11b DSSS and 802.11g/n OFDM
Operating Frequency	2412~2483.5MHz ISM band
Antenna	2 on-board metal PIFA antennas.
Number of Channels	11 (US), 13 (EU), 14 (Japan)
Data Rates	802.11n: up to 300Mbps 802.11g: 54Mbps with fallback to 48, 36, 24, 18, 12, 9 and 6Mbps 802.11b: 11Mbps with fallback to 5.5, 1 and 1Mbps
Modulation Schemes	802.11g/n: 64QAM (up to 300Mbps), 16QAM (39/36/26/24Mbps), QPSK (19.5/18/13/12Mbps), BPSK (9/6.5/6Mbps) 802.11b: CCK (11/5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Tx Power (typical)	18.17±1dBm for 802.11b 26.37±1dBm for 802.11g 26.28±1dBm for 802.11n (HT20)



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	<b>22.14±1dBm for 802.11n (HT40)</b>
Rx Sensitivity (typical)	-82dBm for 802.11b @11M -72dBm for 802.11g @54M -68dBm for 802.11n HT20 @MCS15 -65dBm for 802.11n HT40 @MCS15
Media Access Protocol	CSMA/CA with ACK
Supply Voltage	5V+/- 5%

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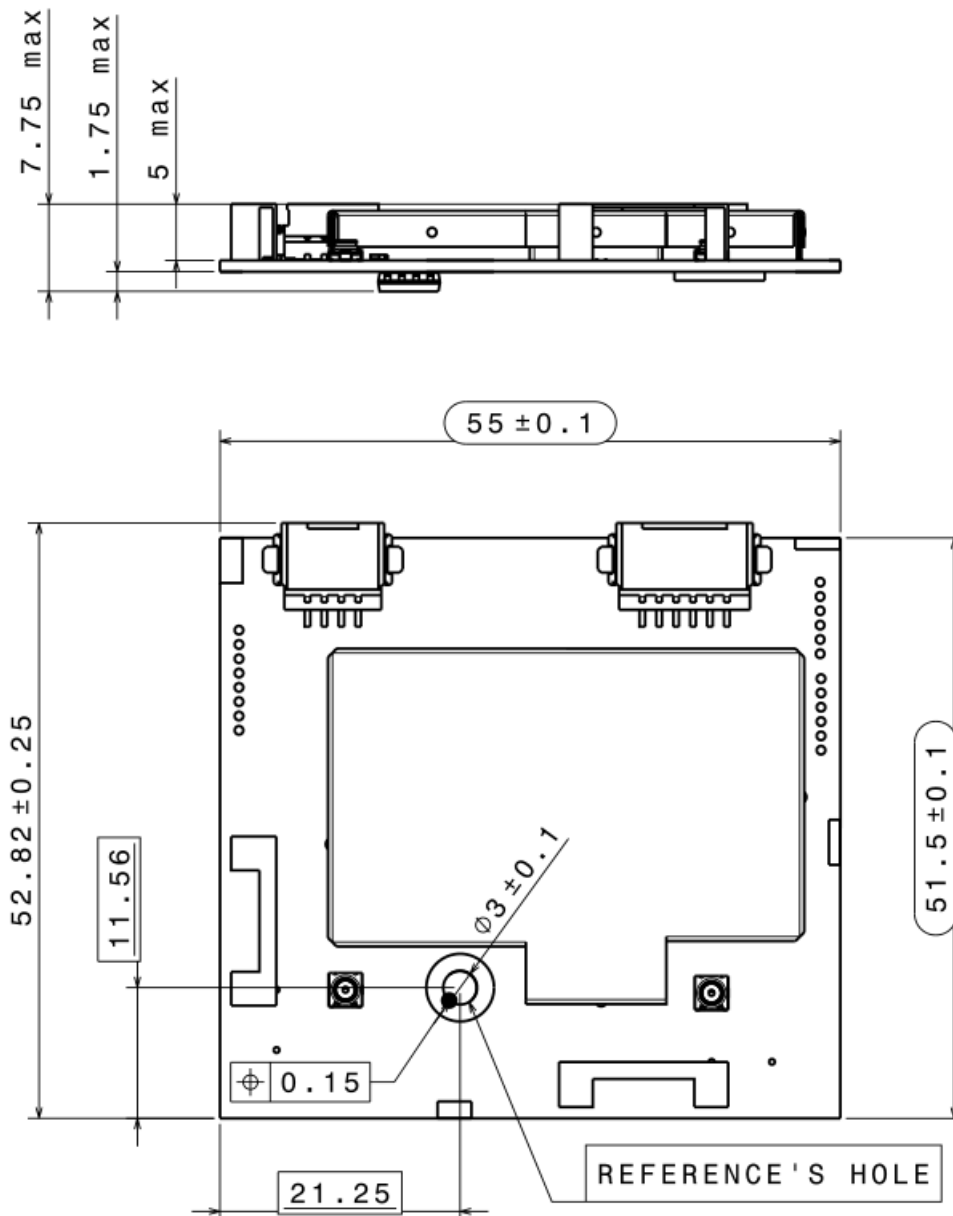
<i>Model Number</i>	<i>NIU X</i>
Power Requirements (typical) (TBD)	Tx mode: 11Mbps: 360mA 54Mbps: 370mA 65Mbps: 410mA Rx mode : 11Mbps: 220mA 54Mbps: 220mA 65Mbps: 210mA
Power in Standby Modes	100mA
Dimensions	54.74 x55 x 9.06 mm (typical)
Regulatory Conformance	EMI: FCC Part 15b, Part 15c Europe EN 301 489, EN 300 328 Safety : Europe : EN 60950-1, EN 62311
RoHS Compliance	Yes
Operating Temperatures	-20 ~ +85°C
Storage Temperatures	-40 ~ +85°C
Software Functions	ROM API Support: (TBD)
MFi support	Ready





## 4. Mechanical Characteristics

### 4.1 Module Dimensions



## 4.2 Pin Out Definitions

The logical definitions of the module's pins are depicted below.



Pin number	Signal
1	GND
2	+5VDC +-5% suggested (for optimal radio performance), 5.25V / 4.2V maximum permitted range
3	NIU UART RX (3V3, 5V tolerant)
4	NIU UART TX (open collector, max pull-up at 5V)



Pin number	Signal
1	VUSB Supply voltage output
2	USB D+
3	USB D-
4	GND
5	GPIO1 (2V5)
6	GPIO2 (2V5)

**Figure 2: Pin out Configurations**

## **5. Block Diagram**

## **6. US requirements**

### **6.1 Label of the end product**

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: 2AIBX-NIUXL ". If the labelling area is larger than the palm of the hand, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

### **6.2 Additional rules for US market**

The module can only be used without additional authorizations if they have been tested and granted under the same intended end-use operational conditions, including simultaneous transmission operations.

### **6.3 IMPORTANT NOTE:**

This module is intended for OEM integrator.

The OEM integrator is still responsible for

1. ensuring that the end-user has no manual instructions to remove or install module
2. the FCC compliance requirement of the end product, which integrates this module.
3. Appropriate measurements(e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. Verification, Doc) of the host device to be addressed by the integrator/manufacturer.
4. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations

### **6.4 USERS MANUAL OF THE END PRODUCT:**

The module is limited to installation in mobile or fixed applications

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than the palm of the hand, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

### **6.5 Federal Communication Commission Interference Statement**

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 separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **6.6 FCC Caution:**

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

### **6.7 FCC Radiation Exposure Statement:**

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

## **7. Canada requirements**

### **7.1 Label of the end product**

The final end product must be labeled in a visible area with the following " Contains IC ID: 21700-NIUXL" .

DOC: CAN ICES-3 (B)/NMB-3(B)

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:  
(Pour utilisation de dispositif module)

- 1) L'antenne doit être installée de telle sorte qu'une distance de 20cm est respectée entre l'antenne et les utilisateurs, et
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

### **7.2**

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

This device may not cause interference; and

This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne

doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **7.3 IMPORTANT NOTE:**

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps

### **7.4 IMPORTANT NOTE For OEM integrator:**

This module is intended for OEM integrator.

The OEM integrator is still responsible for

1. ensuring that the end-user has no manual instructions to remove or install module
2. the ISED compliance requirement of the end product, which integrates this module.
3. Appropriate measurements and if applicable additional equipment authorizations of the host device to be addressed by the integrator/manufacturer.
4. The separate approval is required for all other operating configurations, including portable configurations and different antenna configurations

## **8. Warranty**

Two years limited warranty.