

PRODUCT SPECIFICATION

N240A-SRL

Wi-Fi 1x1 11ax dual band+ BLE 5.4

Combo Module

Version:v1.1

Customer:	
Customer P/N:	
Signature:	
Date:	
Office: 14th floor, Block B, pho	oenix zhigu, Xixiang Street, Baoan District, Shenzhen
Factory: NO.8, Litong RD., Liuyang Eco	onomic & Technical Development Zone, Changsha, CHINA
+86-755-2955-8186	Website:www.fn-link.com

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N240A-SRL Module Datasheet

Ordenis	Part NO.	Description
Information	FGN240ASRL-00	AIC8800D40L,a/b/g/n/ac/ax,1T1R,Wi-Fi6,BLE5.4,12X12,1T1 R,SDIO



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Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2023/09/07	New version	LXP	LXY	QJP
V1.1	2024/01/22	Update 2.4G mode	LXP	TZQ	QJP
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# **1. General Description**

### **1.1 Introduction**

N240A-SRL is a highly integrated chip with dual band Wi-Fi6, BLE5.4 for wirelessapplication. Its WLAN function supports the SDIO 3.0 interface, and BT only supports UART interface. The module provides simple legacy and 20MHz/40MHz co-existence mechanism to ensure backward and network compatibility.Support 2.4GHz/5GHz Wi-Fi6.

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The wireless module PHY rate can achieve up 286.8Mbps

### **1.2 Description**

Model Name	N240A-SRL
Product Description	Support Wi-Fi /BT functionalities
Dimension	L x W x H: 12 x 12 x 2.47mm
Wi-Fi Interface	Support SDIO 3.0
OS supported	Android /Linux/ Win CE /XP/WIN7/WIN10
Operating temperature	-20°C to 80°C
Storage temperature	-40°C to 125°C



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### 2. Features

### General

- Compliant with IEEE 802.11a/b/g/n/ac/ax
- support 2.4G+5G dual band, 20/40MHz bandwidth
- Wi-Fi Security WEP / WPA / WPA2/WPA3-SAE Personal, MFP
- Support STA, SoftAP, Wi-Fi Direct modes concurrently
- Support STBC, beamforming
- Support Wi-Fi 6 TWT

### **PHY Features**

■ Data rates up to 286.8Mbps with 20/40MHz bandwidth

### **Host Interface**

- Supports SDIO3.0/USB2.0
- Supports all the mandatory and optional features of Bluetooth low energy 5.4
- Supports advanced master and slave topologies







# 4. General Specification

# 4.1 2.4GHz RF Specification

Feature	Description				
WLAN Standard	IEEE 802.11b/g/n/ax, Wi-Fi compliant				
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)				
Number of Channels	2.4GHz: Ch1 ~ Ch13,Ch14				
Modulation	DBPSK/DQPSK/CCK(DSSS)、BPSK/QPSK/16QA	AM/64QAM(OF DM)			
Test Items	Typical Value	EVM			
	802.11b /11Mbps : 18dBm ± 2 dBm	EVM ≤ -10dB			
	802.11g /54Mbps : 15dBm ± 2 dBm	EVM ≤ -25dB			
Orteret Deres	802.11n /MCS7 : 15dBm ± 2 dBm	EVM ≤ -28dB			
Output Power	802.11ax /MCS9 : 14dBm = 2 dBm	EVM ≤ -32dB			
	802.11ax /MCS11/: 13dBm±2 dBm	EVM ≤ -35dB			
	SIN N				
Spectrum Mask	Meet with IEEE standard				
Freq. Tolerance	±20ppm				
Receive Sensitivity	NUMber O 95 JDer	≤-76dBm			
(11b,20MHz) @8% PER	- Thylops (@-630Bm				
Receive Sensitivity	54Mbrs 72dPm	< 69dDm			
(11g,20MHz) @10% PER	- Staviops (@-750Bii	<u>&gt;-080BIII</u>			
Receive Sensitivity	MCS=7 @_70dBm	<-67dBm			
(11n,20MHz) @10% PER	- WCS-7 @-70dBiii				
Receive Sensitivity	-MCS=7 $@-68dBm$	< 61dDm			
(11n,40MHz) @10% PER					
Receive Sensitivity	- MCS=11 @_63dBm	<-52dBm			
(11ax,20MHz) @10% PER		<u></u>			
Receive Sensitivity	- MCS=11 @61-dBm	<-49dBm			
(11ax,40MHz) @10% PER		_ +/ <b>U</b> DIII			
Maximum Innut Level	802.11b : -10 dBm				
Maximum input Devel	802.11g/n : -20 dBm				
Antenna Reference	Small antennas with 0~2 dBi peak gain				



# 4.2 WI-FI 5GHz Specification

Feature Description				
WLAN Standard	IEEE 802.11a/n/ac/ax, Wi-Fi compliant			
Frequency Range	5.150 GHz ~ 5.850 GHz (5.0 GHz Band)			
Test Items	Typical Value	EVM		
	802.11a 54Mbps: 15dBm ± 2 dBm	EVM ≤ -25dB		
	802.11n MCS7: 15 dBm± 2 dBm	$EVM \le -28dB$		
Output Dowor	802.11ac MCS8: 14dBm ± 2 dBm	$EVM \le -30dB$		
Output Power	802.11ac MCS9: 14dBm ± 2 dBm	$EVM \le -32dB$		
	802.11ax MCS11 : 12dBm ± 2 dBm	$EVM \le -35dB$		
	$\otimes$			
Receive Sensitivity	- 6Mbps PER @ -89 dBm, typical	<b>≤-</b> 85		
(11a,20MHz) @10% PER	- 54Mbps PER @ -71 dBm, typical	<b>≤-6</b> 8		
Receive Sensitivity	- MCS=0 PER @ -89 dBm, typical	<b>≤-</b> 85		
(11n,20MHz) @10% PER	- MCS=7 PER @ -69 dBm, typical	≤-67		
Receive Sensitivity	- MCS=0 PER @ -87 dBm, typical	≤-82		
(11n,40MHz) @10% PER	- MCS=7 PER @ -67 dBm, typical	<b>≤-6</b> 4		
Receive Sensitivity	- MCS=0 PER @ -85 dBm, typical	<b>≤-8</b> 1		
(11ac,20MHz) @10% PER	- MC\$=8 PER @ -66 dBm, typical	≤-59		
Receive Sensitivity	- MCS=0 PER @ -83 dBm, typical	≤-79		
(11ac,40MHz) @10% PER	- MCS=9 PER @ -63 dBm, typical	≤-54		
Receive Sensitivity	- MCS=0 RER @ -82 dBm, typical	≤-78		
(11ax,20MHz) @10% PER	- MCS=11 // PER @ -65 dBm, typical	≤-52		
Receive Sensitivity	- MCS=0	≤-78		
(11ax,40MHz) @10% PER	- MCS=11 PER @ -62 dBm, typical	<b>≤-4</b> 9		
	802.11a/n: -30 dBm			
Maximum input level	802.11ac: -30 dBm			
	802.11ax: -30 dBm			

Conditions : VBAT=3.3V ; VDDIO=3.3V ; Temp:25°C



# 4.3 Bluetooth Specification

Description				
LE(1Mbps), LE(2Mbps)				
UART				
2400 MHz ~ 2483.5 MHz				
40 channels for BLE				
GFSK,				
A.				
out Power , tolerance ± 3 dB				
CL1(dBm)				
SEL N				
9				
Sensitivity, tolerance :/ dB				
/				
-85				
-83				
GFSK :-20dBm				



# 5. ID setting information

#### WI-FI

Vendor ID	TBD
Product ID	TBD

### 6. Pin Definition





# 6.2 Pin Definition details

NO.	Name	Туре	Description	Voltage	
1	GND	_	Ground connections		
2	WL/BT_ANT	I/O	WLAN and BT RF I/O port		
3	GND	_	Ground connections		
4	NC	_	Floating (Don't connected to ground)		
5	GND	—	Ground connections		
6	HOST_WAKE_BT	I/O	GPIOB3/HOST_WAKE_BT	VIO	
7	BT_WAKE_HOST	I/O	GPIOB2/BT_WAKE_HOST	VIO	
8	NC	—	Floating (Don't connected to ground)		
9	VBAT	Р	Main power voltage source input	3.3V	
10	USB DM	I/O	USB DM		
11	USB DP	I/O	USB DP		
10		T	Default Power Enable: pull high 6ms	1/10	
12	PWR_WF	1	Power Disable: pull low	VIO	
13	WF Wake Up Host	I/O	WF Wake Up Host	VIO	
14	SD_D2	I/O	SDIO data line 2, GPIQA15	VIO	
15	SD_D3	I/O	SDIO data line 3, GPIOA14	VIO	
16	SD_CMD	I/O	SDIO command line, GPIOA13	VIO	
17	SD_CLK	I/O	SDIO clock line ,GPIOA12	VIO	
18	SD_D0	I/O	SDIO data line 0, GPIOA11	VIO	
19	SD_D1	I/O	SDIO data line 1, GPIOA10	VIO	
20	GND		Ground connections		
21	NC	-	Floating (Don't connected to ground)		
22	VDDIO	Р	I/O Voltage	1.8V/3.3V	
23	GPIOB4	I/O	GPIOB4, if not used please keep NC	VIO	
24	HOST_WAKE_WF	1/0	HOST_WAKE_WF	VIO	
25	PCM_DOUT	0	PCM Data output	VIO	
26	PCM_CLK	I/O	PCM clock	VIO	
27	PCM_DIN	Ι	PCM data input	VIO	
28	PCM_SYNC	I/O	PCM sync signal	VIO	
29	UART0 TX	I/O	GPIOA9, UART0 TX	VIO	
30	UART0 RX	I/O	GPIOA8, UART0 RX	VIO	
31	GND	_	Ground connections		
32	NC	_	Floating (Don't connected to ground)		
33	GND	_	Ground connections		
34	NC	_	Floating (Don't connected to ground)		
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35	GPIOB6	I/O	GPIOB6,, if not used please keep NC	VIO
36	GND	—	Ground connections	
37	NC	_	Floating (Don't connected to ground)	
38	NC	_	Floating (Don't connected to ground)	
39	NC	_	Floating (Don't connected to ground)	
40	NC	_	Floating (Don't connected to ground)	
41	UART1_RTS	I/O	BT_UART1_RTS, GPIOA7	VIO
42	UART1_TX	I/O	BT_UART1_TX, GPIOA5	VIO
43	UART1_RX	I/O	BT_UART1_RX, GPIOA4	VIO
44	UART1_CTS	I/O	BT_UART1_CTS, GPIOA6	VIO

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P:POWER I:INPUT O:OUTPUT

# 7. Electrical Specifications

### 7.1 Power Supply DC Characteristics

The digital IO supports VDD33 or VDD18 application.

	MIN	ТҮР	MAX	Unit
Operating Temperature	-20	25	80	deg.C
VBAT	3	3.3	3.6	V
VDDIO	1317	1.8/3.3	3.6	V
1 provention				

# 7.2 Power Consumption

2.4G	Test condition: VBAT=3.3V / VDDIO=3.3V	
	Current @ TX	Current @ RX
	Maximum(mA)	Maximum(mA)
11b@20dbm	268	57
11g@17dbm	187	57
HT20-mcs7@16dbm	179	58
HT40-mcs7@16dbm	163	57
VHT20-mcs8@16dbm	164	56
VHT40-mcs9@16dbm	162	56
HE20-mcs11@15dbm	138	57
HE40-mcs11@15dbm	134	58



	Test condition: VBAT=3.3V / VDDIO=3.3V				
56	Current @ TX	Current @ RX			
	Maximum(mA)	Maximum(mA)			
54M@17dbm	215	58			
MCS7 HT20@17dbm	206	56			
MCS7 HT40@17dbm	188	56			
MCS8 VHT20@17dbm	203	58			
MCS9 VHT40@16dbm	186	57			
MCS11 HE20@15dbm	185	58			
MCS11 HE40@14dbm	174	58			
8.1 Module Picture					
H: 2.47 (±0.2) mm	0.8 *	$2.47\pm0.2$			
vveignt		U.59(±0.1)g			







# 9. The Key Material List

Item	Part Name	Description	Manufacturer
1	Inductor	2016 4.7uH,±20%	Sunlord, Ceaiya, Cenker, Taiyo, inpaq
2	Crystal	2016 40MHz ±10ppm	ECEC, TKD, Hosonic, JWT, TXC
3	Chipset	AIC8800D40L	AIC
4	РСВ	FR4, 4 LAYER, GREEN	XY-PCB,GDKX,Sunlord, SLPCB,Truly
5	shielding	N240A-SRL shielding	Sun-tek, JLitong,卓益

# **10. Reference Design**

Note: Module requires independent power supply , supply capacity  $\geq$  1A and ripple less than 100mV; Do not share power with amplifier, infrared device, camera, etc.

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N240A-SRL





# 12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

### 13. Package

### 13.1 Reel

A roll of 1500pcs





# 13.3 Packaging Detail

the take-up package



Using self-adhesive tape Size of black tape: 24mm*32.6m the cover tape :21.3mm*32.6m Color of plastic disc: blue



NY bag size:450mm*415mm



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size : 350*350*35mm



The packing case size:360*210*370mm



### 13.4 Tray

### Use pallet packaging for less than 300 pieces





# 14. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)

b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5

c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition

b) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected

d) Baking is required if conditions b) or c) are not respected

e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more

# Integration instructions for host product manufacturers according to KDB 996369 D03 OEMManual v01

Conditions on using FN-LINK TECHNOLOGY LIMITED regulatory approvals: A. Customer must ensure that its product (The "Wi-Fi/BT module") is electrically identical to FN-LINK TECHNOLOGY LIMITED reference designs. Customer acknowledges that any modifications to FN-LINK TECHNOLOGY LIMITED reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.

B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to FN-LINK TECHNOLOGY LIMITED.

C. Customer is responsible for regression testing to accommodate changes to FN-LINK TECHNOLOGY LIMITED reference designs, new antennas, and portable RF exposure safety testing/approvals.

D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.

E. A user's manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below:

#### 2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart E

#### 2.3 Specific operational use conditions

Radio Technology: Bluetooth BLE Operation frequency: 2402-2480MHz Channel No.: 40 channels Data rate: 1Mbps/2Mbps Channel Separation: 2MHz Modulation: GFSK Antenna Type: PCB antenna, max gain 4.46dBi (Antenna information is provided by applicant.)

Radio Technology: 2.4G WIFI Operation frequency: 2412MHz-2462MHz for IEEE 802.11 b, g. n/HT20, ax20, 2422MHz~2452MHz for IEEE802.11n/HT40, ax40 Channel No.: 802.11b/802.11g /802.11n (HT20)/802.11ax20: 11 802.11(HT40)/802.11ax40: 7 Modulation type: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM) Antenna Type: PCB antenna, max gain 4.46dBi (Antenna information is provided by applicant.) Radio Technology: 5G WIFI Operation Frequency: 802.11a/n (HT20)/ac (VHT20)/ax20: 5180~5240MHz; 5260-5320MHz; 5500-5700MHz; 5745~5825MHz 802.11n (HT40)/ac (VHT40)/ax40: 5190~5230MHz; 5270-

5310MHz; 5510-5670MHz; 5755~5795MHz Channel separation: 20MHz for 802.11a/ 802.11ac (VHT20)/ 802.11n (HT20)/ax20

40MHz for 802.11ac (VHT40)/ 802.11n (HT40)/ax40 Modulation technology: IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA

(64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM) Antenna Type: PCB antenna, max gain 7.16dBi

(Antenna information is provided by applicant.)

The module can be used for mobile or portable applications with a maximum 7.16dBi antenna. The host manufacturer installing this module into their product must ensure that the final composit product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

#### 2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

#### 2.5 Trace antenna designs

The antenna used is the PCB antenna on the module.

#### 2.6 RF exposure considerations

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. Changes or modifications 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 radi-ate radio frequency energy and, if not in-stalled 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.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

#### 2.7 Antennas

Antenna Specification are as follows: Antenna Type: PCB antenna Antenna Gain (Peak): BLE&2.4GWIFI: 4.46dBi 5GWIFI: 7.16dBi (Provided by applicant) This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna:

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheralrequirements, etc.).

#### 2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID: 2AATL-N240A-SRL" With their finished product.

#### 2.9 Information on test modes and additional testing requirements

Radio Technology: Bluetooth BLE Operation frequency: 2402-2480MHz Channel No.: 40 channels Data rate: 1Mbps/2Mbps Channel Separation: 2MHz Modulation: GFSK Antenna Type: PCB antenna, max gain 4.46dBi (Antenna information is provided by applicant.) Radio Technology: 2.4G WIFI Operation frequency: 2412MHz-2462MHz for IEEE 802.11 b, g. n/HT20, ax20, 2422MHz~2452MHz for IEEE802.11n/HT40, ax40 Channel No.: 802.11b/802.11g /802.11n (HT20)/802.11ax20: 11 802.11(HT40)/802.11ax40:7 Modulation type: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM) Antenna Type: PCB antenna, max gain 4.46dBi (Antenna information is provided by applicant.)

Radio Technology: 5G WIFI Operation Frequency: 802.11a/n (HT20)/ac (VHT20)/ax20: 5180~5240MHz; 5260-5320MHz; 5500-5700MHz; 5745~5825MHz 802.11n (HT40)/ac (VHT40)/ax40: 5190~5230MHz; 5270-5310MHz; 5510-5670MHz; 5755~5795MHz Channel separation: 20MHz for 802.11a/ 802.11ac (VHT20)/ 802.11n (HT20)/ax20 40MHz for 802.11ac (VHT40)/ 802.11n (HT40)/ax40 Modulation technology: IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM) Antenna Type: PCB antenna, max gain 7.16dBi

(Antenna information is provided by applicant.)

Host manufacturer must perfom test of radiated & conducted emission and spurious emission, etcaccording to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

Only when all the test results of test modes comply with FCC requirements, then the end product canbe sold legally.

#### 2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.